Golden Age of Air Racing! **Westwind—an RC Low Wing.**

MODEL AIRPLANE NEWS

MARCH 1958—35 CENTS

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"I keep my contest engines running longer at FULL POWER with

Champions, like Bob Palmer, are aware that most fuels leave residues that accumulate on engine parts, soon causing power fall-off. So they have always had "pet" engines used ONLY for contest flights, in order to baby them and retain their peak performance as long as possible.

But this is *no longer necessary* . . . because the special new lubricant—LUBEX 27—in Pactra POWER FUEL leaves a *minimum* of residue—easily expelled from the exhaust. And POWER FUEL runs cooler, too, giving *maximum* protection against overheating, seizing and scoring—so destructive to engines. Its balanced formula provides consistently smooth running throughout the entire flight, switching easily and smoothly from 2-cycle to 4-cycle operation . . . so very important for successful stunt maneuvers. The broader range of POWER FUEL eliminates need for critical needle valve adjustment in order to bring engines to flying speed . . . thus getting the plane in the air faster which, combined with the FULL power it gives, means *longer flights* per tankful . . . more economy.

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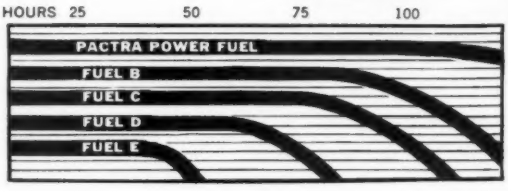

* *Winner Nationals OPEN STUNT Championship and 7 times California OPEN STUNT champion. One of Bob's favorite planes is this "Veco" Thunderbird, powered by a Veco .35 Engine.*

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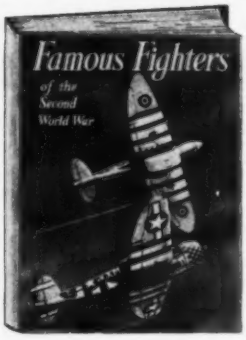

Contains all important Fighting planes of the Second World War. Highly detailed drawings (over 160) of Japanese, American, English, German fighters. As many as 43 photos of each plane is given of various views. As many as 12 pages are devoted to each plane, giving details of from the first experimental model of each plane right on up to the latest model used in the War. Full story of Pre-War Military Air Races and the results of each plane that competed. All Markings and Camouflage patterns shown. Some of the planes are "Spitfire", "Messerschmitts", "Zero", "Mustang" etc. Highly recommended to Scale Builders.

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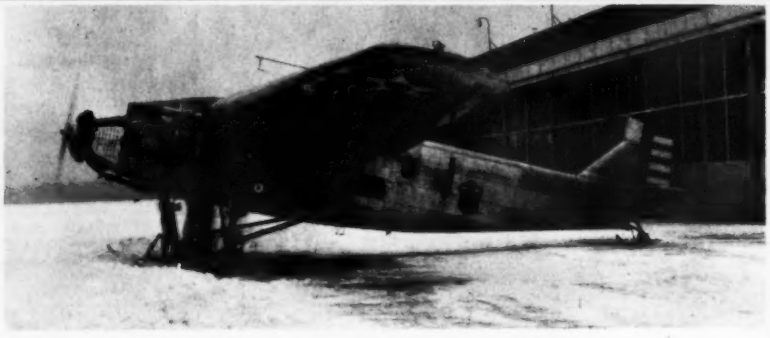

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The Ford Story is a complete pictorial history of the Ford Tri-Motor covering the period 1927 through 1957. More than 250 photos compliment this excellently written book. The Ford Story surpasses all other books published in this country concerning aviation history. The many never-before-published photos together with super-detailed 3-views and exceptionally detailed text make the Ford Story a must for everyone interested in aviation of yesteryear. Dealer inquiries invited.

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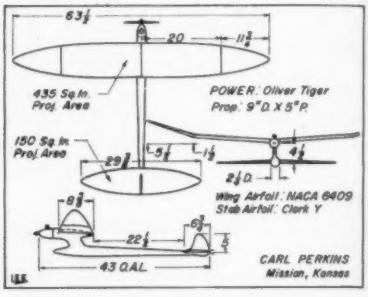
INTERNATIONAL COMPETITION NEWS



FAI gas entry, Carl Perkins, Mission, Kan. It qualified Mid-west semi-finals, 807 sec. total.

► The International Competition Committee, AMA, has announced the elimination program for this year. In keeping with the policy of selecting the teams a year in advance, this year's program will pick the USA Nordic team. Local eliminations will be held in many cities and areas across the country. A list of these sites will be published in a future.

NORDIC ELIMINATION DATES
Local elims: August 24, 1958
Semi-finals: September 28, 1958

These dates will prevail throughout the country. The A2 class of Nordic will be the only event flown, as there is no International contest for the smaller class. No provision as yet has been made for any Speed Trials; however, things can be easily developed along this line provided enough interest is shown by those interested in this event.

To take up the slack of having no Wakefield eliminations this coming season, and to keep interest in this event at a high point, the EASTERN INVITATIONAL WAKEFIELD event will be held on the June 14-15 weekend. This event will be held at Solberg Airport, Somerville, N. J. Entry will be by teams only.

Teams can be made up of modelers from a club, city, or section of state. No less than three per team, or no more than four per team, will be allowed. Final team standings will be based on the times of the three highest men on each team. Each team will be required, as part of its entry, to provide one contest official. Flying will be by the round system, and will end not later than 12 noon Sunday.

Proxy teams will be permitted to enter, no matter where in the US they come from. This will be limited to the number of proxy fliers available.

All proxy models must be shipped prepaid to the contest and they will be returned prepaid. A trophy suitable to the occasion will be awarded the winning team. This contest will be flown in strict accordance with International rules.

The event will afford modelers in the eastern section of the country to meet and discuss mutual problems. Interested parties can obtain complete written information by writing to Ed Dolby, 25 Exchange St., Rockland, Mass.

Ed Dolby
International Competition Committee

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Super-tough high-impact plastic throughout.
Authentic moulded-in details.
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29th Year of Publication

MODEL AIRPLANE NEWS

M.A.N.

JAY P. CLEVELAND, President and Publisher

MARCH 1958 Vol. LVIII, No. 3

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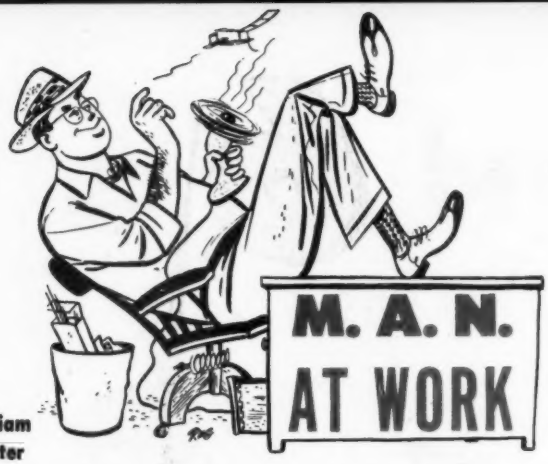

by William Winter

► To MAN at Work's question, "Has the hobby industry forgotten the stick-and-paper modelers on whom the whole blooming business was built," many people replied in all shades of opinion. Having replaced the fuse, restarted our fan, and retrieved that indoor model, which vanished out the window during the excitement, we quote "the loyal opposition."

Harvey R. Swack, vice president, the Triple C Corp., must have spent more time on his letter than we spent on the original column, makes many points. To mention a few: first, about the lack of stepping-stone kits.

"I wonder just how crippling this lack really is," he asks. "Berkeley has a CAP set that contains three projects: an all balsa glider, an all-balsa ROG, and a built-up flying model. Jetco makes a fine line of gliders, a good ROG, and several built-up jobs that could serve as stepping stone kits. California models and Comet have kits that could do the trick. Comet recently introduced a gift kit called a 'Set-Up' set which contains both plastic and wood kits—start with the plastic ones and continue through the wood ones. Carl Goldberg's new kits, Top Flite's Jig Time series and Cleveland's Quicky kits are excellent beginners' models."

Stating that the old pattern—where the beginner worked up from a glider, through ROG's, simple built-ups—has been reversed today, Harvey argues that kids naturally begin with small gas motors, bought cheaply with allowances, or got by trading or as left-overs from ready-to-fly plastic jobs. From here, he states, the kid looks for the wood built-ups, because he realizes wood is lighter and performance is better. Obviously, he doesn't want a glider or ROG—he wants something for his motor which he already has heard roar and seen flying on the end of lines. He will learn how to make these models, either through manufacturer's instructions or magazine plan directions. Then Swack gets off one statement with which most people will not quarrel.

"One of our more important jobs is to make flying areas available. The modeler of today," says Harvey Swack, "wants to fly and not just spend his time on large time-consuming projects."

Although many people do prefer fancy scale jobs, Swack to the contrary, it is true that the mass of youngsters are raring to fly. Swack thinks the new Pee Wee engine will spur the sales of (*Continued on page 7*)

NEXT MONTH'S COVER
Travel Air Mystery S ▶

PLANE ON THE COVER

Matty Laird, the great biplane builder, gave the racing fraternity something to think about in 1930 when his Solution beat the monoplanes in the Thompson Trophy Race—see Golden Age of Air Racing, page 9. R. J. Hoffman, whom modelers knew, at that time was Laird's chief engineer. Glamorous Laird last bipe to make it!

Now! 6 OK Cub Engines

with AUTO RECOIL STARTERS!

AIRCRAFT — Here is a group of engines that has proved its versatility in stunt and free flight. Now, the light weight built-in auto recoil starter brings the engine to instant life with a simple pull of the cord.

Cub .049S (illus.) **$6.95**
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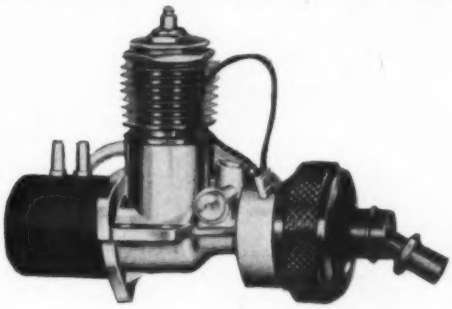

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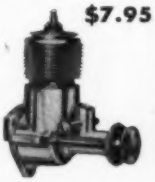

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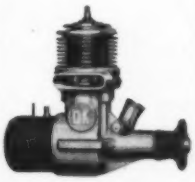

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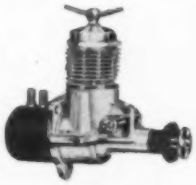

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Tornado Nylon: 5½" or 6", 3-4p ..... .25
9" or 10", 4-6p ..... .45
Tornado 10" D 3-5-6p ..... .50
8", 6" or 7" D 3-4-5-6-8 P. ..... .30
8" or 9" D 3-4-5-6-8 P. ..... .35
Manta Ray 11" - 4p ..... .45
9" or 10", 4, 6p ..... .45
Keyson chutes: 6", 5½/2"p., 6½/4, 6/3, 6/4, 6/6, - 15c; 7/3, 7/4, 7/5 ..... .20
Top-Flite—4" in 3.4.5p—20c; 7" in 3.4, 4.5p—25c; 8" in 4.5.6.7p ..... .35
8p: 10" in 5½, 5.4, 6.12p—25c; 11" in 4.6.8.10.12p; 12" in 4.8p; 13" 8p—30c; 14" 8p—35c; AND ALL OTHERS!
Top Flite 5½" or 6" 3 or 4 p. ..... .15
Tornado 3 Blade (R or LH) 6". 3p ..... .20

METAL GAS TANKS

Darwin Brass Pre-Wire (¼" w, ⅛" h):
1" ..... 1½" ..... 2" ..... 2½" ..... 3"
L (2½" ..... 3" ..... 4" ..... 5" ..... 6" 1.00
Fromm: .23 (⅞" w, ⅜" h):
1¼" ..... 1½" ..... 2⅛" ..... 2¾" ..... .48
#21 (1" w, ½" h):
1¼" ..... 1½" ..... 2" ..... 2½" 1.10
Perfect: 1½" x 1" x 2 (or 3") ..... .59
1½" x 1" x 2½" (or 4") ..... .69

GLO PLUGS (STATE ENGINE)

McCoy, OSR, K&B, Kwik Start, Veco Coe, Fury, Wasp or T.D. ea. ..... .45
O.C. (short or long) ..... .50
Champion Spark ..... .50

WHEELS

K&B Alum. Hub: 1" — 40c; 1½" — 45c; 2" — 50c; 2½" — 60c; 3" — 75c 1.00
Sonic Propeller (pr) 2" 1.25
2½"—1.40; 3"—1.75

PROPELLERS

Tornado Nylon: 5½" or 6", 3-4p ..... .25
9" or 10", 4-6p ..... .45
Tornado 10" D 3-5-6p ..... .50
8", 6" or 7" D 3-4-5-6-8 P. ..... .30
8" or 9" D 3-4-5-6-8 P. ..... .35
Manta Ray 11" - 4p ..... .45
9" or 10", 4, 6p ..... .45
Keyson chutes: 6", 5½/2"p., 6½/4, 6/3, 6/4, 6/6, - 15c; 7/3, 7/4, 7/5 ..... .20
Top-Flite—4" in 3.4.5p—20c; 7" in 3.4, 4.5p—25c; 8" in 4.5.6.7p ..... .35
8p: 10" in 5½, 5.4, 6.12p—25c; 11" in 4.6.8.10.12p; 12" in 4.8p; 13" 8p—30c; 14" 8p—35c; AND ALL OTHERS!
Top Flite 5½" or 6" 3 or 4 p. ..... .15
Tornado 3 Blade (R or LH) 6". 3p ..... .20

METAL GAS TANKS

Darwin Brass Pre-Wire (¼" w, ⅛" h):
1" ..... 1½" ..... 2" ..... 2½" ..... 3"
L (2½" ..... 3" ..... 4" ..... 5" ..... 6" 1.00
Fromm: .23 (⅞" w, ⅜" h):
1¼" ..... 1½" ..... 2⅛" ..... .48
#21 (1" w, ½" h):
1¼" ..... 1½" ..... 2" 1.10
Perfect: 1½" x 1" x 2 (or 3") ..... .59
1½" x 1" x 2½" (or 4") ..... .69

GLO PLUGS (STATE ENGINE)

McCoy, OSR, K&B, Kwik Start, Veco Coe, Fury, Wasp or T.D. ea. ..... .45
O.C. (short or long) ..... .50
Champion Spark ..... .50

WHEELS

K&B Alum. Hub: 1" — 40c; 1½" — 45c; 2" — 50c; 2½" — 60c; 3" — 75c 1.00
Sonic Propeller (pr) 2" 1.25
2½"—1.40; 3"—1.75

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Fish (Pyro) 12" Plast. In or Outbd. 2.98
Cobra (Dumas) 27" 6.95
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C.C. Catalina 31½" .19 to .35 ..... 8.95
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Sea Dart 16" (Outboard) 3.95
Sterling C.C. Sea Skiff AA-A 2.98
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MODEL BOATS

Air Sea Rescue 30" .099 or elec. 12.95
North Star 25" .19 R.C. or elec. 16.95
Little Breeze 32" .09 R.C. or elec. 14.95
American Scout 50" R/C 16.95
U.S.S. Missouri 56" R/C 16.95
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Corvette (Sterling) 48" R/C 26.95
Cobra 16" (Sterling) 2.98
Allycraft 18" Plast. In or Outbd. 4.98
Fish (Pyro) 12" Plast. In or Outbd. 2.98
Cobra (Dumas) 27" 6.95
Chris-Craft Challenger 33" C-D 11.95
C.C. Catalina 31½" .19 to .35 ..... 8.95
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Hiawatha 36" R/C 19.95
C.C. Motor Yacht 40" .19-.29 ..... 19.95
Sea Dart 16" (Outboard) 3.95
Sterling C.C. Sea Skiff AA-A 2.98
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YOU SAVE A GREAT BIG $10.00

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SOLD FOR $6.95 3.95

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Speedy racer goes to 60 mph. Prefab w/4 rubber wls. & carved body. 18" long, ½A engines.

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Deluxe, all-prefabbed model. For engines .059 to .099. An excellent control line flyer.

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PYLON control lines	
.008, .010, .012, .014, .016: 2-52'	.60
.008, .010, .012, .014, .016: 2-70'	.75
Stranded .015 - .018 x 2/52'	1.75
Stranded .015 - .018 x 2/70'	2.00
.020 .025 A-B	2.50
Plastic Handle 4" or 5"	.45
T. D. Handy Reel & Handle ½A	1.50
Mercu- U-C Handle	.69
Deluxe Reel .15 - .19	11.95
Adjustable Push Rod Set	.25
Stiff Lead-Out .014, .020, .022 3'	.30
Flyon Bellcrank 2"—20; 3"	.35
Veco Bellcrank 2"—28; 3"	.35
Screw-on small 15c pr.; large	.20
Conn. Clips A, B, C or D	2 for .15
Tru-Turn RR Bellcrank	12.95
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1½, 1¾, 2, 2¼" ea.	.10
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ORDER FUELS BY MAIL WE SHIP C.O.D. ANYWHERE IN U.S.A.

Fox Hi-Nitro	Pt. .75
Fox Super Fuel	Pt. .50
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MAN at Work

(*Continued from page 4*)

Comet's and Goldberg's models—among others. Designed for rubber only, they are easily adapted for power. So the Pee Wee is an aid in the transition of the potential honest-to-goodness modeler into the balsa society.

Lack of space compels us to skip Harvey's lengthy and erudite explanation of why a modern dealer must have many irons in the fire, for seasonal business trends alone; and how, therefore, the dealer is interested in "toys," and, consequently, toy manufacturers interested in the hobby business.

"If any manufacturers suffer poor sales, I suggest they develop new kits," challenges Triple C's Swack, "and repackage and advertise their wares properly. Cleveland reintroduced their old SF ¾ inch S6-MES kits. These were consistently advertised during the past year. They were packaged in an ordinary cardboard box with the name of the kit stamped on the end of the box. Sales have increased so that Cleveland is considering repackaging the entire line at considerable expense. A manufacturer who introduces new kits regularly insures that the customer, dealer, and wholesaler, won't forget or overlook his line. (Editor—Swack says flashy boxes are a must and claims *you* demand them.)

"A percentage of those who assemble plastic kits," Swack winds up, "will go further up the ladder eventually to become real modelers. The more people assembling plastics, the more people available to carry on with serious modeling. Good promotional efforts will speed up the progress. For example, Guillow has used full page advertisements in MAN to promote their rubber-powered WW 1 flying scale models and customer and dealer response has been surprisingly good.

"The statement that the airplane minded dealer is dubbed a dope, is rather all inclusive. I agree that the average dealer is not as business minded as he could be. But the same thing applies to jobbers and manufacturers alike. Business clinics held for dealers at trade shows have proved successful. Jobbers have started holding day-long seminars devoted to business problems. I wouldn't be surprised," says Swack, "if manufacturers do the same in the future. Good business techniques are important to all segments of the Association."

• • •

► The industry did, in fact, show a re-awakening interest in real modeling this past year. And, granting that the dealer has to sell beads and things to keep a roof over his head, we are reminded of the desperate modeler who needs a Torp .15 head gasket. Hobby shops outnumber super markets in his city—but still no Torp gaskets. Not believing the dealers' excuses, our lad called four New York jobbers. No gaskets! And we bet Johnny Brodbeck has gaskets coming out of his ears. Jack Greenberg (also from Triple C) fingers the problem.

"Triple C goes to these shows," states Greenberg. "At the last several shows there have been only two or three nice booths sponsored by wood airplane manufacturers. We can show you back orders for wood kits that are three to six months old. We have twice as much trouble keeping wooden kits in stock as plastic. Accessories are even worse. We can wait six months for some manufacturers to ship. Radio control is even worse—if that is possible.

"If more wood kit manufacturers would wake up to the changing market of today

(*Continued on page 62*)

Radio Control AHC

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by ROBERT C. HARE

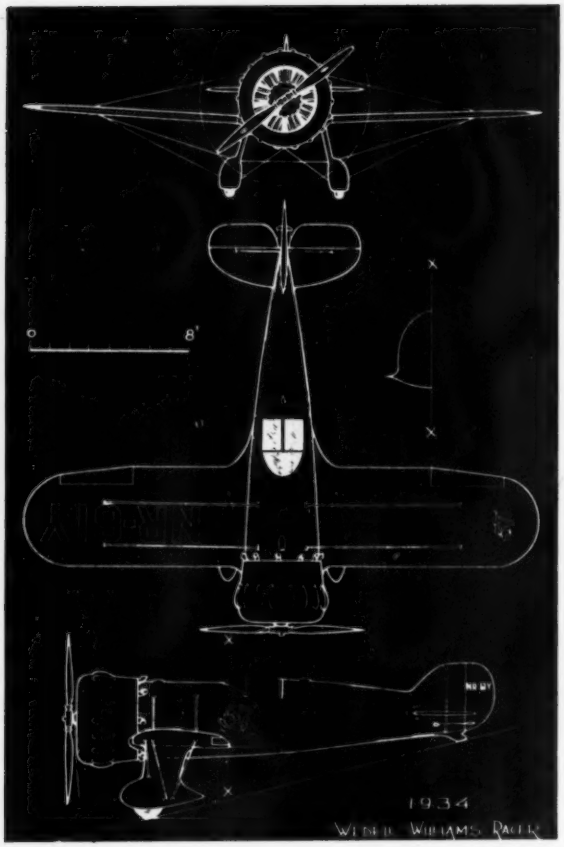
► Since the earliest day of aviation, plane designers have streamlined and whittled resistance here, added power there, in order to increase the number of miles an hour an airplane could travel. Pilots have risked their lives pushing their planes to—and sometimes beyond—structural and control limits to be just a few tenths of a mile faster than their closest competitor.

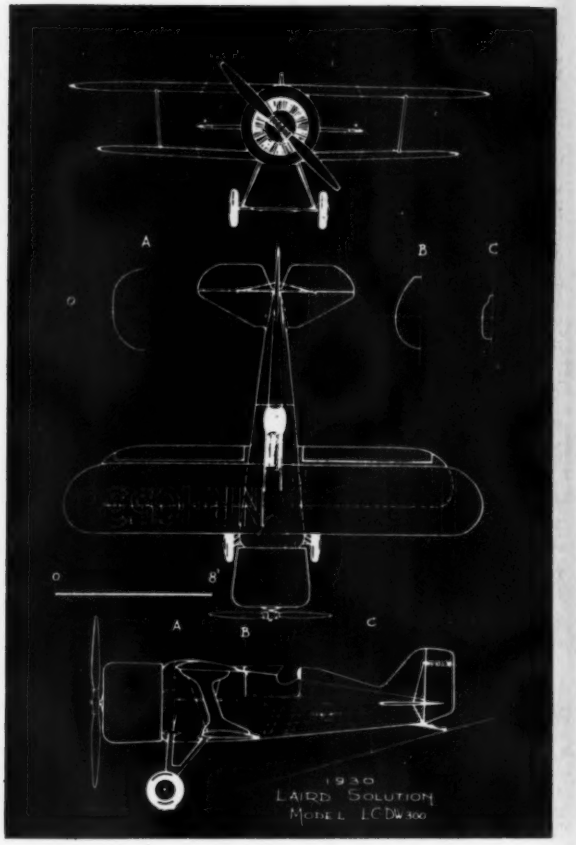
Straightaway timed speed runs, while perhaps more revealing of a plane's performance to a designer or engineer, lacked the daring and bravado that accompanied a hard fought closed course race, as far as the public was concerned. Aviation's pioneers found out early in the game that the sight of a dozen bamboo and wire contraptions wheeling inside one anothers' arcs on sharp pylon turns was something the public was willing to pay to watch. Devil-may-care pilots, as well, liked this sport. Engine or parts manufacturers and wealthy patrons of the flying art were willing to finance new designs and generally make air racing worthwhile to themselves as well as to the pilots.

Prior to World War I, "air meets" were established as a stylish sport for the thrill-seeking society crowd that took a fancy to the struggling, oil spattered aviator. War soon stopped that, however, as pilots and their sponsors both turned to more serious things.

Following World War I, air racing as a sport in which the private pilot could participate, fell to a pretty low ebb. What racing there was, took place at county fairs or at small air shows. Surplus World War I equipment, with clipped wings or oversized engines, failed to recreate the color and thrills of pre-war races.

The post-war Pulitzer Trophy Races, however, satisfied the speed hungry to some extent. The Pulitzer was dominated by government financed designs and the (*Continued on next page*)





pilots were service pilots. These races had the broad objective of developing racing designs that could form the basis of military fighters. In this respect the Pulitzer succeeded and by 1925 the winning speed was a respectable 248 mph over a closed course. Curtailment of government funds for development of high speed racers in the late 1920's put an end to the Pulitzer, although standard service type ships still were entered by the Army and Navy in closed course racing. Service types still dominated, however, but at the 1928 National Air Races, the best closed course speed was a disappointing 141 mph.

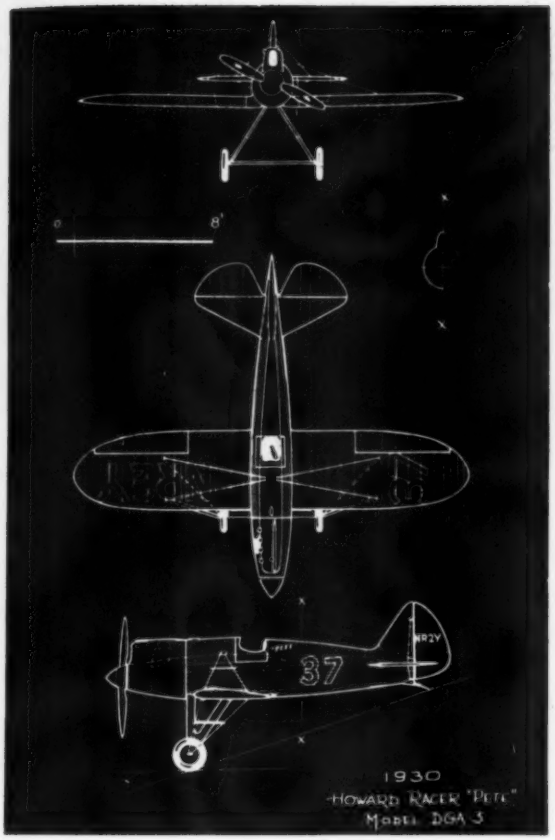
A number of business leaders in the aviation and allied fields became alarmed over the lack of interest in air racing on the part of the private pilot, the backyard designer and the frustrated but imaginative engineer. One of these industry leaders, Charles E. Thompson, founder of Thompson Products, Inc., decided to do something about it. He announced that the Thompson Trophy would be put up for competition during the 1929 National Air Races. This "no holds barred" race was for planes of unlimited horsepower, a free-for-all event of five laps over a ten mile course. Best of all, from the participants' standpoint, was a cash purse of $5,000. Here was the shot in the arm the sport needed, a race that would allow the ingenuity of American designers to compete, with their pet ideas and theories, in the development of racers as best their minds and pocketbooks could conceive.

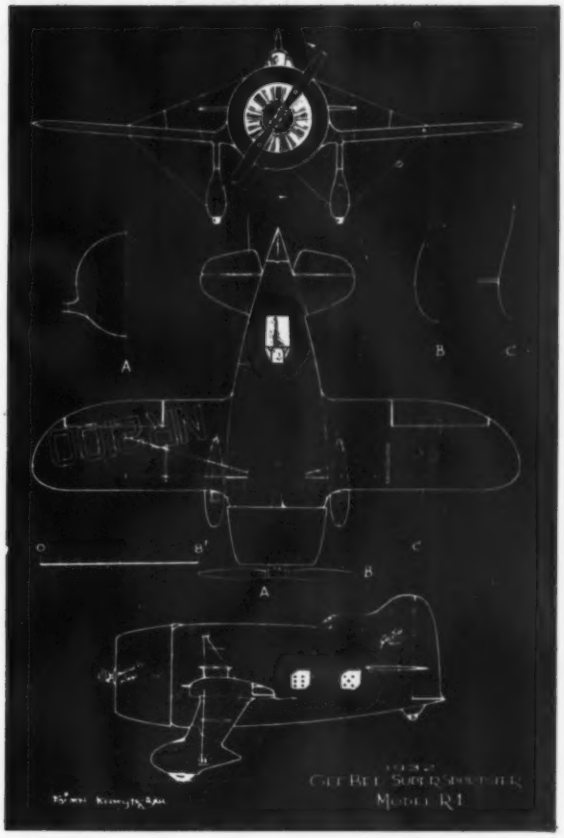
The Golden Age of Air Racing

There was little opinion, in 1928, that the 1929 Thompson Trophy Race would be much more than a repeat of the previous rather dull closed course races of the late 1920's. There was a big surprise in store for the doubters, however. When the Thompson competition was announced, a group headed by the late Walter Beech, rolled

The late Jimmie Wedell made famous the Wedell Williams racers. Ironically, he was killed in a crash when a student froze stick.

Wedell Williams No. 44, took second in 1931, 1932; first, 1933, Los Angeles, where picture taken. Doug Davis crashed it in '34.





up its sleeves and went to work on a revolutionary "dream" airplane. The lines of this ship that went down the boards was to set a pattern for both racing and military configurations for years to come. Behind closed doors Beech, head of the Travel Air Company, developed the new racer in the greatest secrecy. Closely guarded, it was called the Travel Air Mystery "S", and for good reason.

Piloted by Douglas Davis, the Mystery "S" led its competition over the finish line of the first Thompson at a speed of 194 mph. It was the first time a privately built civilian airplane had beaten a military type in a closed course race! With this victory of the "S", we can say that the age of private, free-for-all, unlimited horsepower air racing on an organized basis—the Golden Age of Air Racing—was born. The "ho-hum" public attitude that had tired of poor performance suddenly changed. The popular cheer that greeted Davis was heard across the nation.

In 1929, the nation was still thrilled over the transatlantic flight of Charles Lindbergh; the Dole Hawaiian flights still were in the public mind as were the San Francisco-Australia flight of the "Southern Cross" and Jackson and O'Brien's 17½ day endurance record aloft in a Curtiss "Robin" using aerial refueling.

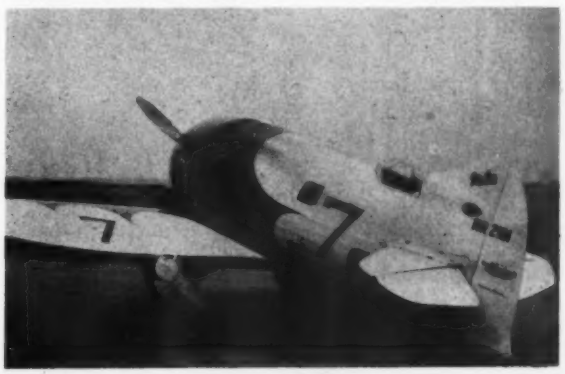
Davis' achievement and the design of the Mystery "S" put pilots and designers in a mood for more of the 1929 Thompson fare. Sensing the extreme interest in a continuation of the Thompson Trophy Race as a regular National Air Races feature, the race committee approached Thompson Products to establish a permanent trophy. In response, the Charles E. Thompson Trophy was set up as a perpetual trophy beginning with the 1930 National Air Races.

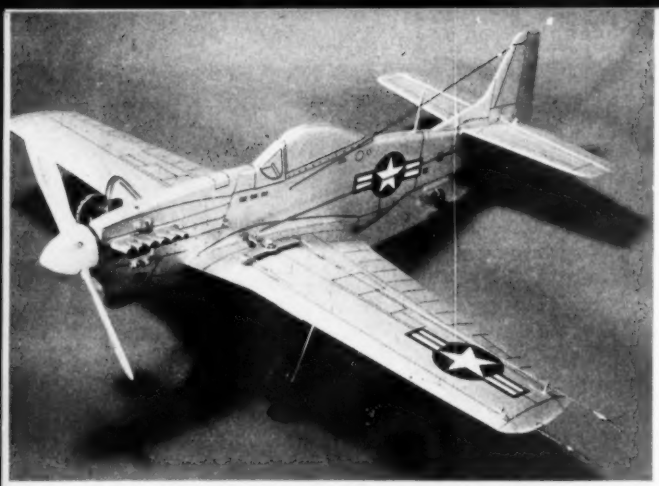
The ten Thompson Trophy Races run from 1930 through 1939 constitute an era of aircraft design and performance highly significant in the development of high speed aircraft. The first five races saw the birth of a handful of new designs that were developed to *(Continued on page 45)*

Travel Air Mystery ship was only tried-and-true racer in earlier contests and it exercised a great influence on military designs.

Howard Levy

No. 7 Gee Bee didn't do much in 1932-33 but higher-powered sister ship, No. 11, had a future. Gee Bee fast but forgave no errors.

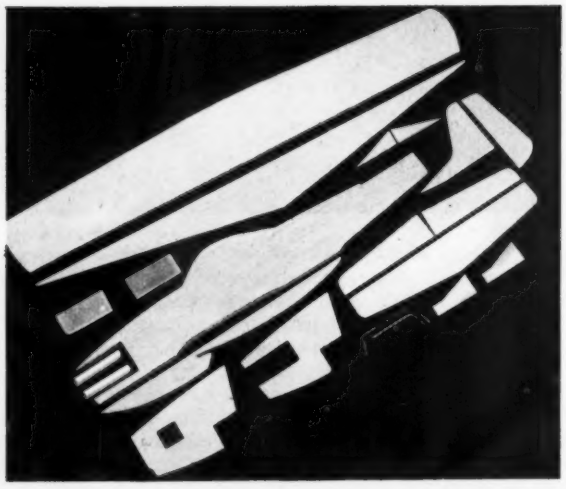




Who said profile models can't be realistic—that K & B .09 even thinks it's a Rolls Royce Merlin! Airplane is a robust performer.

Looks good from this side, too. Other .09's are OK, and you can substitute any appropriate U-control tank. Ask dealer about size.

. . . baby mustang . . .



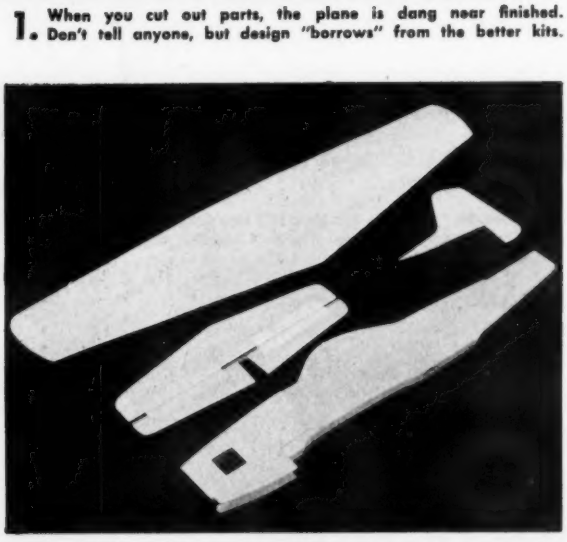
1. When you cut out parts, the plane is dang near finished. Don't tell anyone, but design "borrows" from the better kits.

by PAUL E. DEL GATTO

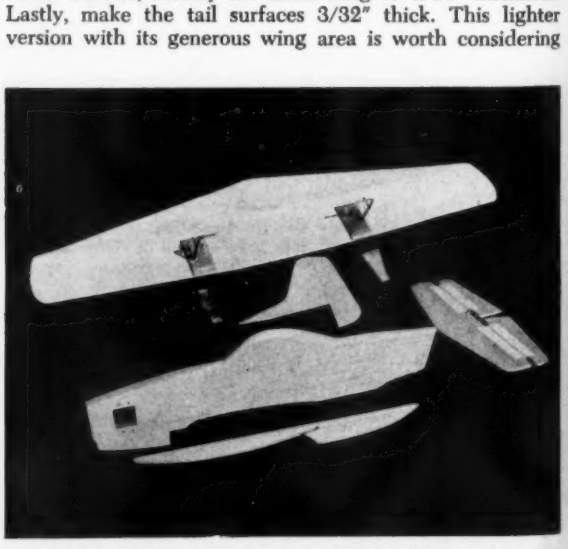
► There is just no getting away from the fact that a profile model is the easiest thing to put together for flying fun. If only they were more realistic! This design blends simple, functional construction, with much of the realistic detail and trim associated with the famed Mustang.

The drawings are full size. Because of the step-by-step photos, the construction of this ship can be followed easily, even by the most inexperienced builder. The model is not small and can be powered by engines up to .09 displacement. So powered, this model can replace the more elaborately built-up sportsters. It is an excellent trainer for anyone learning to fly. Even with an .075, lines remain taut. Control response is good, despite the solid construction.

Should you have an .049 to .065 engine, the model is still a good choice if three important modifications are considered. First, change the fuselage profile to ¼" sheet balsa. Second, modify the main wing to 3/16" thickness. Lastly, make the tail surfaces 3/32" thick. This lighter version with its generous wing area is worth considering



2. During the night the shoemaker's helpers put hinges on flippers, ply doublers on nose. Wing, fin-rudder now assembled.



3. Say, this is easy! Note clever attachment of landing gear legs to wing by means of ply plates, thread wrapping, cement.

Got an .09? Then have yourself a barrel of fun with this profile control-line model of famous Air Force fighter. Full-size plans right here—start now! Beginners welcome.

with the smaller power plants. If Mono-line is used you don't have to be choosy about the weather.

CONSTRUCTION: Begin by cutting out all the main components. Any confusion can be cleared up by studying the photographs. Begin assembly by cementing the hardwood insets in the fuselage profile cut-out and then cement the plywood nose doublers to each side. The main wing surface and trailing edge then are cemented together. The tail surfaces, too, are also assembled. Use either a stitch type cloth hinge as shown in the photo or cloth tape hinges as shown on the plan.

Cement the stab and elevator assembly in position on top of the fuselage profile and cement the wire tail strut in position. The landing gear strut assembly is bound with strong thread or soft wire to the landing gear mounts and these are cemented in their respective positions on the wing bottom.

Cement the completely shaped and sanded main wing to the bottom of the main fuselage profile and then cement the bottom fuselage profile piece in position. The fin and rudder assembly then are cemented in place. Complete any necessary sanding and trimming required to finish the model preparatory to applying remaining details and color trim.

The remaining details consist of the simulated exhaust, wing centersection leading edge, the mast, and the wheel covers for the main wheels and tail wheel. Apply generous Plastic Wood or Plastic Balsa fillets to all joining surfaces to strengthen the joints and to obtain better appearance.

For a finish, begin by applying at least one coat of wood filler and two coats of clear dope, smooth-sanding lightly between each coat. Then brush or spray on at least three coats of silver dope, or whatever color you may prefer, allowing ample time for the surface to dry between each application.

Install the bellcrank assembly, being certain that the control system operates smoothly, and within a range of 40° to 50°. A pair of copper lugs bent approximately midpoint can be used for lead-out guides. Mount the engine and fuel tank in the positions indicated. After assembly, add the decals and other markings shown on the plan and in the photographs. If you have trouble putting in details with pen and ink, try a soft pencil or even a dark colored pencil.

FLYING: Check out the engine and see that it runs smoothly in any attitude. Observe the rules for good take-off with the wind at your back when the model is released. Allow the model to accelerate and gently take-off. This is accomplished with just a slight bit of up motion once the model begins to accelerate. Once in the air, check the model's responsiveness to controls and observe its handling characteristics. From then on, you are on your own. If you have never flown before, use half a tank of fuel. Try holding arm stiff, raising it to climb and lowering it to lose altitude. This motion applies gentle amounts of up or down elevator and avoids bad over-controlling, common on the first few flights.

BILL OF MATERIALS

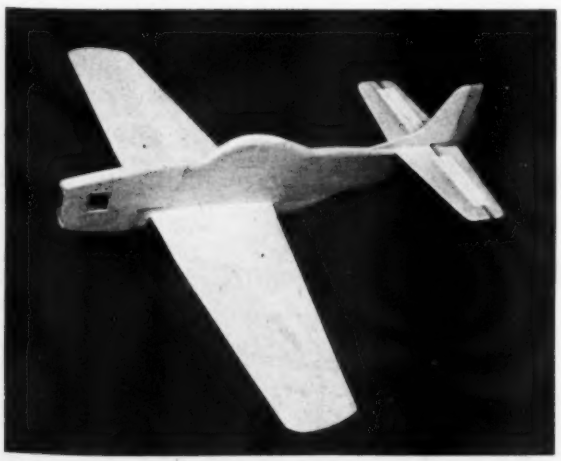
(Balsa unless otherwise specified)

(1) ⅜" x 3" x 18⅜ (hard), tail surfaces; (1) ¼" x 3" x 36" (med.), wing; (1) ⅜" x 3" x 36" (med.), fuselage profile.

¾" diameter dowel; .072" diameter wire; .062" diameter wire; .032" diameter wire; tin can metal; 1½" diameter main wheels; ¾" diameter tailwheel; 2" bellcrank; elevator control horn; 1/16" sheet balsa; 3/16" sheet balsa; 1/16" plywood; lead-out lugs; cloth tape hinges; 3/32" plywood; fuel tank; decals; 1¾" diameter spinner; .075 to .09 engine; ¼" x ¾" hardwood. Measure lengths of material on the plan. You may have useful scraps.

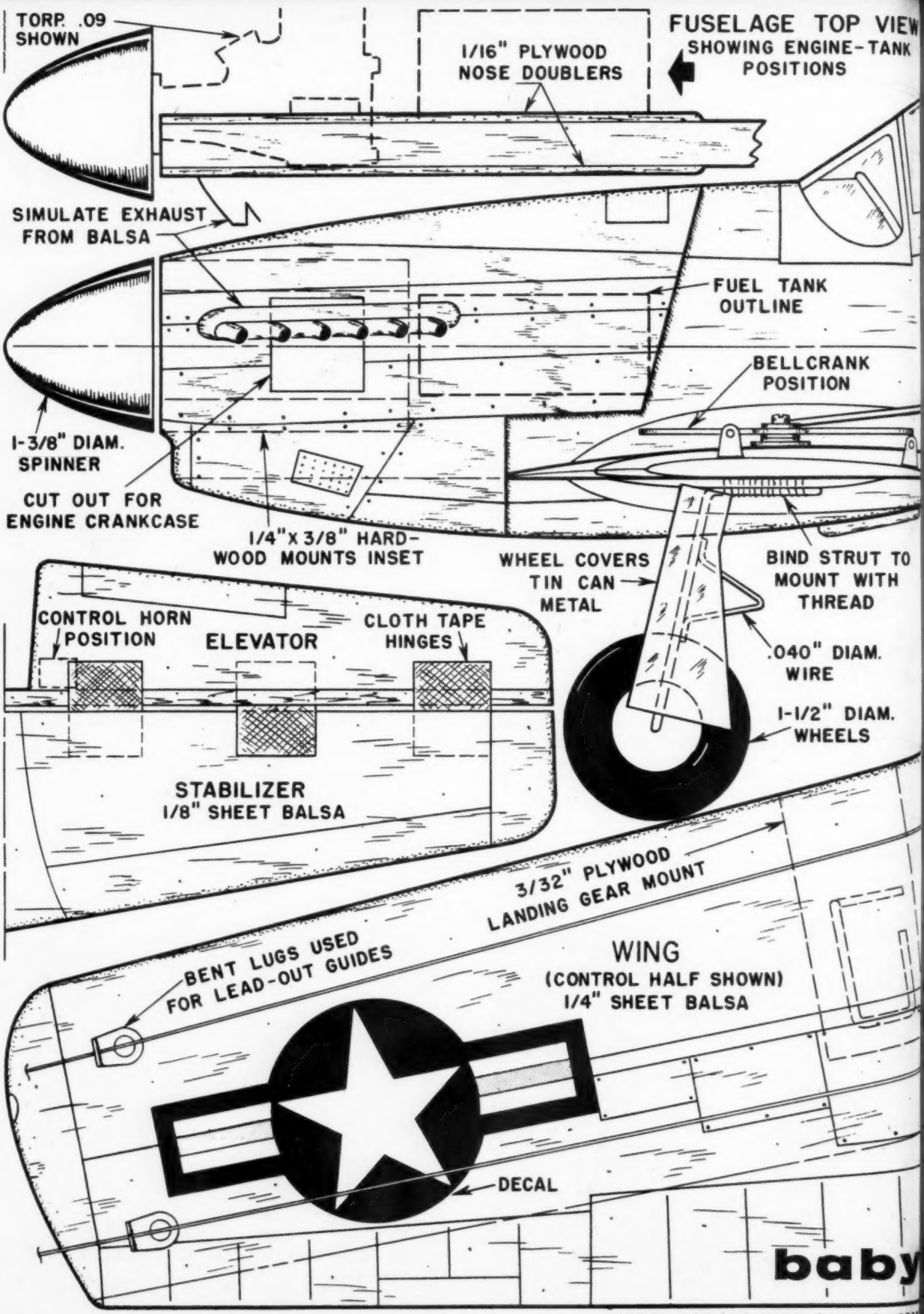
FULL SIZE PLANS FOR BABY MUSTANG

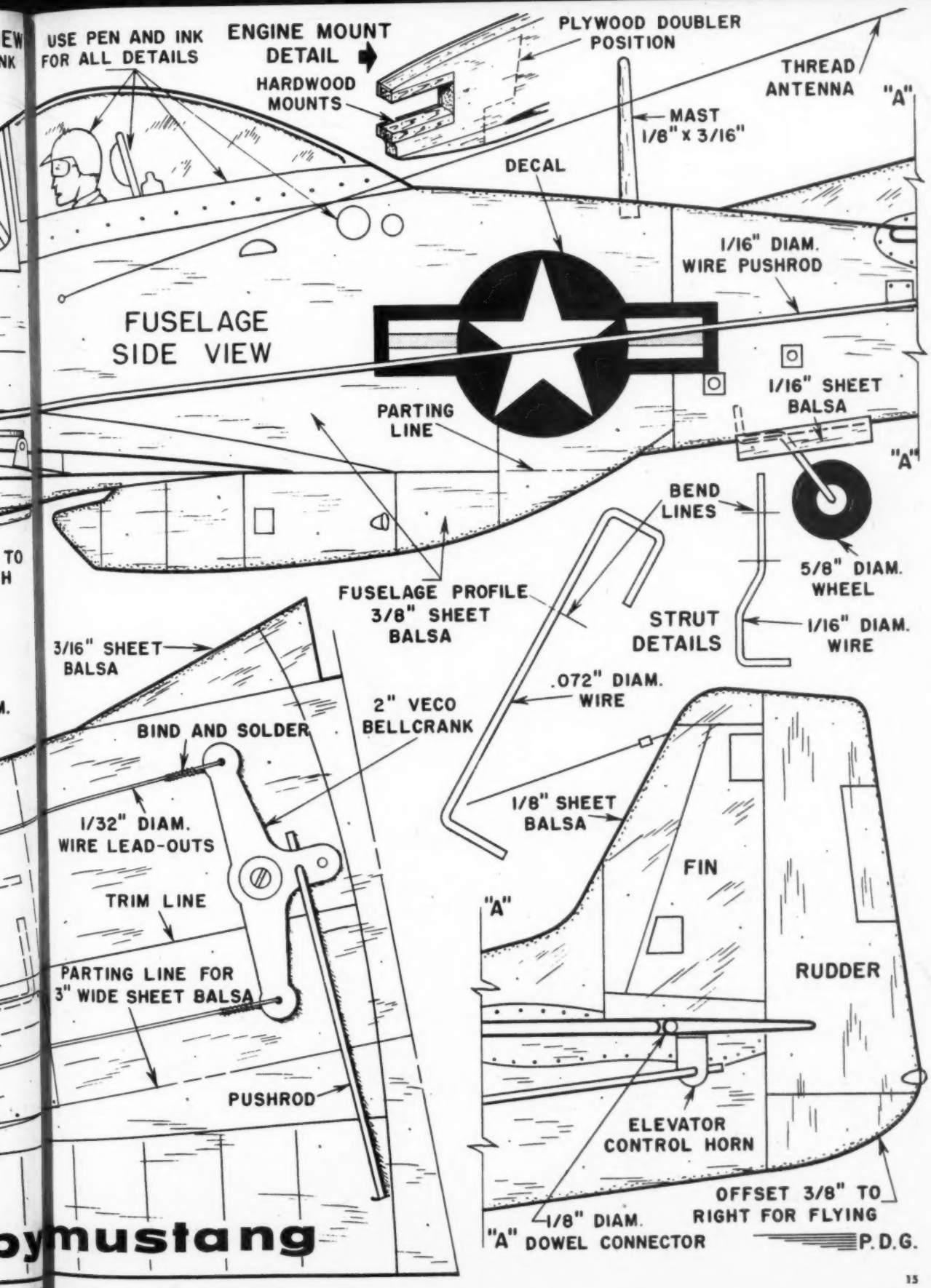
on next two pages



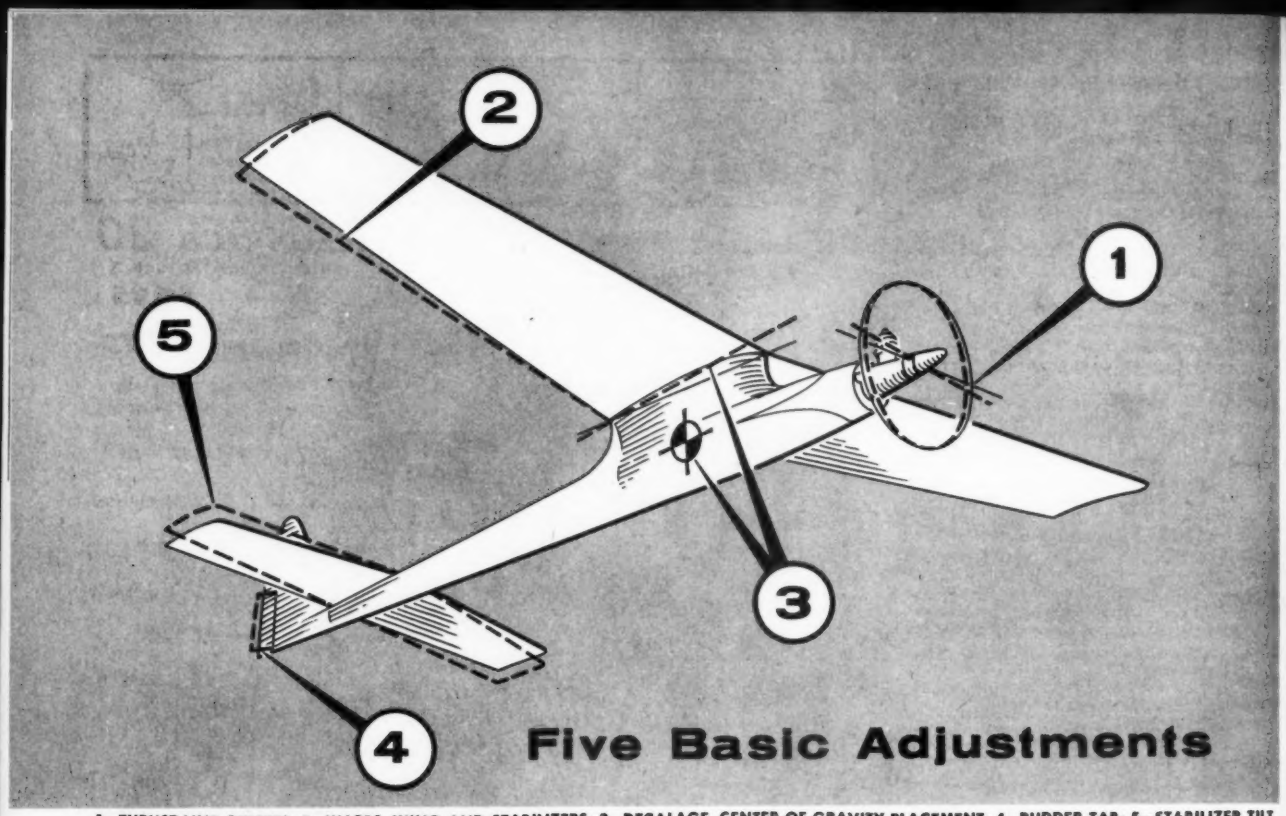
4. Cement wing in place and the Mustang is ekickin' to go! Neat appearance results from careful sanding before the assembly.

5. Silver doped now, it awaits the artistic details! Be certain that controls work freely. No cement and dope snags—check?


TORP. .09 SHOWN
1/16" PLYWOOD NOSE DOUBLERS
FUSELAGE TOP VIEW SHOWING ENGINE-TANK POSITIONS
SIMULATE EXHAUST FROM BALSA
FUEL TANK OUTLINE
BELLCRANK POSITION
1-3/8" DIAM. SPINNER
CUT OUT FOR ENGINE CRANKCASE
1/4"x 3/8" HARD-WOOD MOUNTS INSET
WHEEL COVERS TIN CAN METAL
BIND STRUT TO MOUNT WITH THREAD
CONTROL HORN POSITION
ELEVATOR
CLOTH TAPE HINGES
.040" DIAM. WIRE
1-1/2" DIAM. WHEELS
STABILIZER 1/8" SHEET BALSA
3/32" PLYWOOD LANDING GEAR MOUNT
BENT LUGS USED FOR LEAD-OUT GUIDES
WING (CONTROL HALF SHOWN) 1/4" SHEET BALSA
DECAL

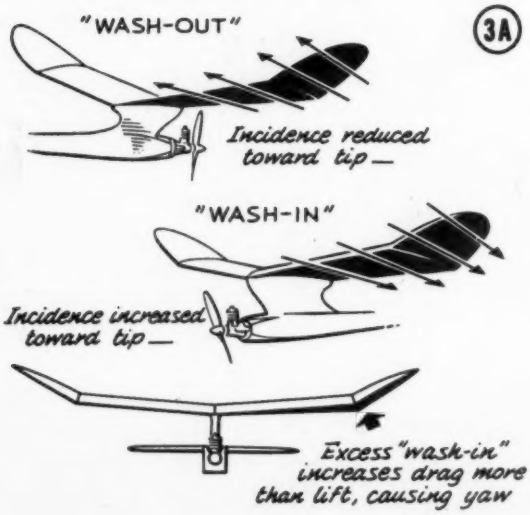

USE PEN AND INK FOR ALL DETAILS
ENGINE MOUNT DETAIL
HARDWOOD MOUNTS
PLYWOOD DOUBLER POSITION
THREAD ANTENNA
"A"
MAST 1/8" x 3/16"
DECAL
1/16" DIAM. WIRE PUSHROD
FUSELAGE SIDE VIEW
1/16" SHEET BALSA
PARTING LINE
"A"
BEND LINES
5/8" DIAM. WHEEL
FUSELAGE PROFILE 3/8" SHEET BALSA
STRUT DETAILS
1/16" DIAM. WIRE
3/16" SHEET BALSA
.072" DIAM. WIRE
2" VECO BELLCRANK
BIND AND SOLDER
1/8" SHEET BALSA
1/32" DIAM. WIRE LEAD-OUTS
FIN
"A"
TRIM LINE
RUDDER
PARTING LINE FOR 3" WIDE SHEET BALSA
PUSHROD
ELEVATOR CONTROL HORN
OFFSET 3/8" TO RIGHT FOR FLYING
1/8" DIAM. "A" DOWEL CONNECTOR
P.D.G.

mustang



1—THRUST-LINE OFFSETS; 2—WARPS, WING AND STABILIZERS; 3—DECALAGE, CENTER-OF-GRAVITY PLACEMENT; 4—RUDDER TAB; 5—STABILIZER TILT.

Note: The longer the nose moment the more effective are thrust offsets.



How to ADJUST the Hot Free Flight

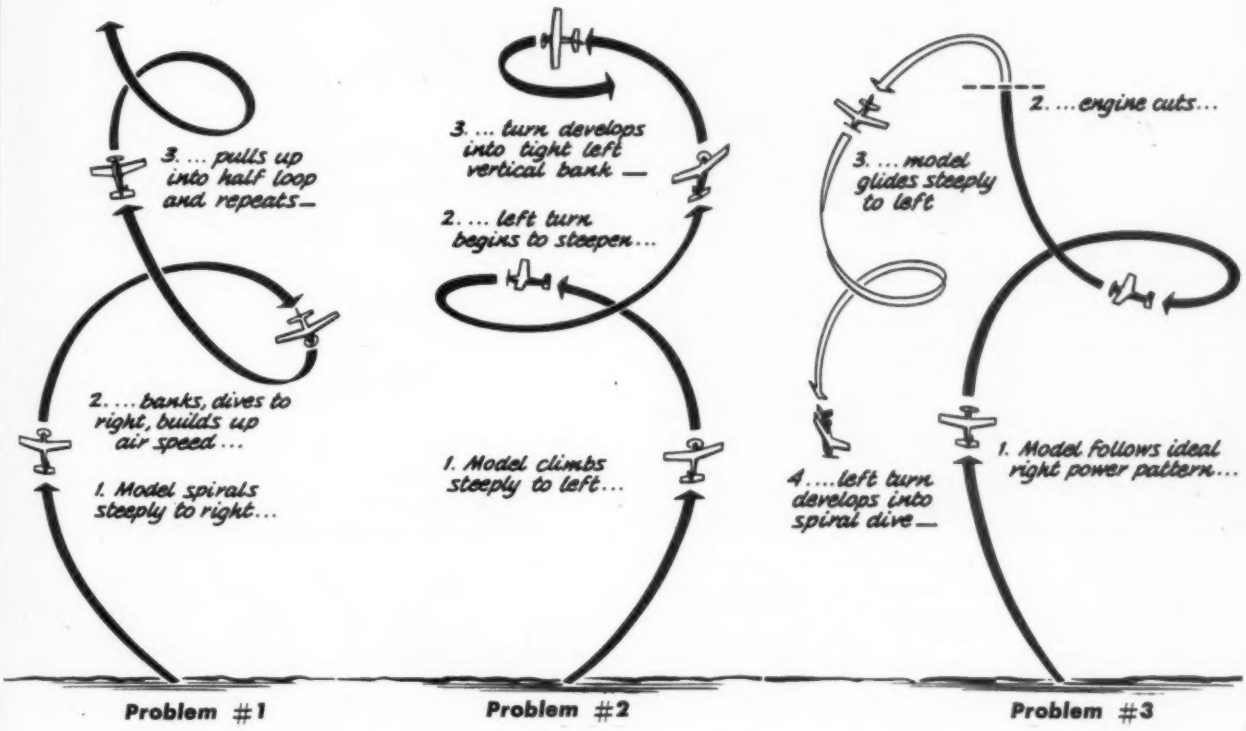
by PHIL KRAFT

Laid end to end all the articles on adjusting would reach to Mercury. Suggestion: burn 'em! Phil really puts it on the line.

►An understanding of aerodynamic force adjustments is basic to the success of the free-flight or radio-control modeler. While a correctly designed flying model should require a minimum of adjustment, the flight pattern of even a perfect design may be upset because of hidden structural defects or misadjustments. Conversely, even a basically bad design may turn in excellent performance if patiently and intelligently adjusted.

Perhaps in no other phase of model building are there as many widely divergent opinions as on how to adjust the contest free-flight. One expert says that it must be done in only one manner and another will say the exact opposite. Probably, both are correct for the particular design they fly, but different designs require different adjustment combinations and even different models of identical design may not require the same adjustments.

A common misconception is that all models of a basic design type must be flown in a particular pattern or direction. While it is true that certain models are designed to


3. ... pulls up into half loop and repeats—
2. ... banks, dives to right, builds up air speed ...
1. Model spirals steeply to right...
3. ... turn develops into tight left vertical bank —
2. ... left turn begins to steepen...
1. Model climbs steeply to left...
2. ... engine cuts...
3. ... model glides steeply to left
4. ... left turn develops into spiral dive —
1. Model follows ideal right power pattern...
Problem #1
Problem #2
Problem #3

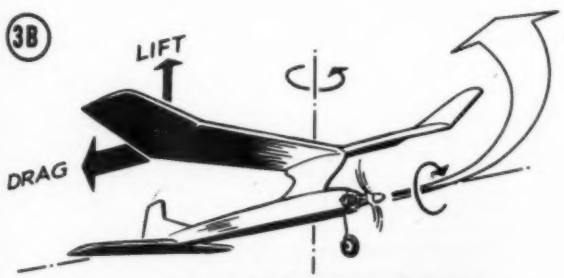
fly in a definite direction and pattern, others fly equally as well either to the right or left and in different type flight patterns. There are no hard and fast rules as to adjustment combinations. Consequently, this article will attempt to define and show the effect of aerodynamic force adjustments separately and then show possible combinations to achieve the desired results. Once the modeler really understands the separate effect of each aerodynamic force adjustment, he will learn by experience to apply them in proper combinations.

The five most important adjustments are: (1) Thrust offsets, (2) Warps of wing and stabilizer, (3) Decalage and center of gravity (CG) placement, (4) Rudder tab, and (5) Stabilizer tilt.

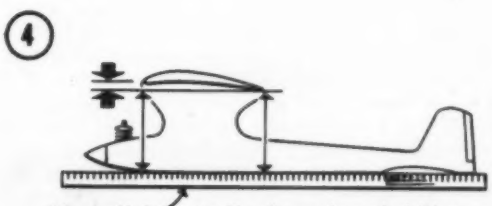
Thrust adjustments are of two different types: Down thrust (propeller shaft tilted at a downward angle to the model's flight path) and side thrust (propeller shaft tilted to right or left of the fuselage center line). The important thing to remember about thrust adjustments is that their effect diminishes as the speed of the model increases. Actually, thrust offsets produce a force which is, for practical purposes, constant; while increases in flight speed produce a proportional increase in the effect of other forces.

Down-thrust is an effective means of eliminating stalls and smoothing out the flight pattern of relatively low-powered aircraft such as radio-controlled and rubber-powered models. Such aircraft slow down as their climb steepens, and as their speed decreases the force of down-thrust becomes increasingly effective to pull the nose down to regain flying speed before a stall occurs.

Many designers of the high-powered contest free-flight build up to 10 degrees down-thrust into their models for two reasons. First, down-thrust helps to produce safe stable VTO take-offs. Second, it helps to prevent looping and, because its effect diminishes with speed, it leaves a safe margin for recovery should *(Continued on next page)*



Example: Right-turning model "Wash-in" in right wing causes yaw to right about vertical axis... but model resists banking due to lift on inner wing which works on model's longitudinal axis —



"Decalage" varies from 0° to 5°, is difference between wing and stabilizer angles... average is 1/32" to 3/64" per inch chord —

How to ADJUST Hot Free Flight

Continued from preceding page

the model pick up an unusual amount of speed. However, down-thrust is not a substitute for proper decalage and CG placement.

While down-thrust results in a loss in thrust efficiency, the loss is relatively small and more than compensated for by the gain in stability.

Side thrust is an excellent means of providing a transitional balance between high- and low-speed trim. As a general rule it should not be used for purely directional trim. To illustrate, suppose a model has a strong spiral dive tendency to the right. If enough left thrust is added, the model may fly straight or even turn to the left until it picks up speed. Then the force or forces producing the right spiral dive in the first place may take over and again the model will spiral dive to the right. To repeat, side thrust is effective as a low-speed turning force and, therefore, usually should be used in conjunction with other adjustments to provide a balance between high and low speed trim.

Warped surfaces have a strong effect on the flight characteristics of an aircraft and are often used to obtain a desired flight pattern.

Wash-in of a surface occurs when the surface is twisted so that the leading edge gradually becomes higher than the trailing edge from root to tip. Wash-out is the opposite. Wash-in increases the lift of a surface but any increase in lift is accompanied by a corresponding and often greater increase in drag. The exact opposite is true of wash-out. Of course, wash-in increases effective decalage; wash-out decreases it.

Wash-out is commonly used to improve the stall characteristics of a wing and to reduce tip drag. High pressure air underneath a wing tends to spill over into the low pressure air on top at the wing tip. The resulting turbulence causes the tips to stall before the center area of the wing. By washing-out the wing tips a wing can be made to stall evenly from root to tip. When this is done, the aircraft does not stall as violently and stability is improved.

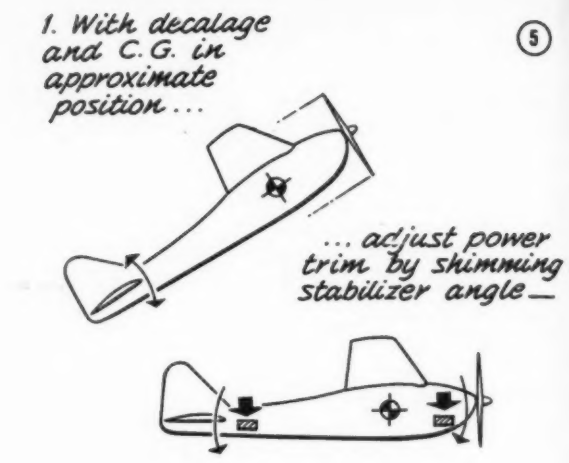
It is the combination of increased lift and drag that makes wash-in of a wing panel useful in achieving the desired climb pattern. Consider a free-flight aircraft with wash-in in the right wing panel. The increased lift of the panel tends to roll the model around its longitudinal axis to the left. The increased drag of the washed-in right panel tends to turn the model to the right. Therefore, in a right spiral climb the model actually rolls to the left as it turns to the right producing the ideal vertical rolling corkscrew type of climb pattern.

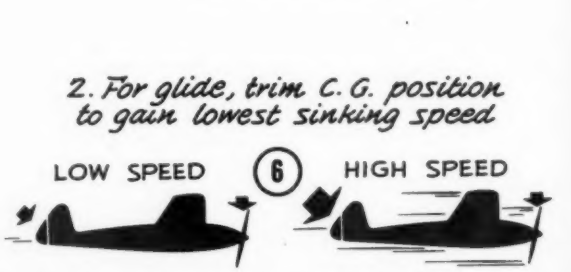
Wash-in or wash-out of a stabilizer panel has effect similar to wash-in or wash-out of corresponding wing panel with two important differences. Wash-in of a stabilizer panel decreases effective decalage while wash-in of a wing panel increases it. A washed-in stabilizer will tend to roll the model the same as wash-in in the corresponding wing panel but the drag of stabilizer wash-in is much less effective as a turning force. At low speeds wing wash-in produces more drag than lift and a model will tend to turn in the glide direction of the washed-in panel.

Decalage and center of gravity placement must be discussed together as they are interdependent.

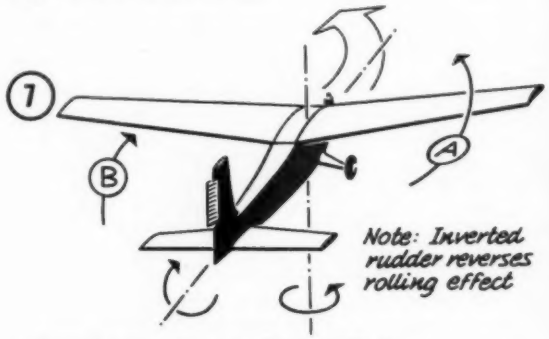
Decalage is the angular difference between the wing and stabilizer. To measure this in a model, place a straight edge parallel to the stabilizer chord line and extending along the fuselage underneath the wing. Measure from the straight edge to the leading and trailing edge of the wing. The amount that the wing leading edge is higher than the trailing edge is expressed as decalage.

For the purpose of this article, the CG may be considered as the point at which (*Continued on page* 54)

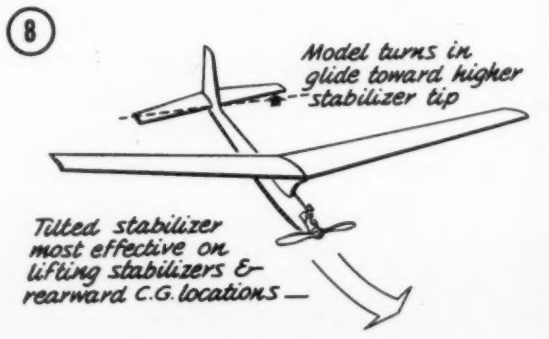




1. Thrust adjustments do not gain effectiveness as speed increases.
2. Tab adjustments gain effectiveness proportionally as speed increases.

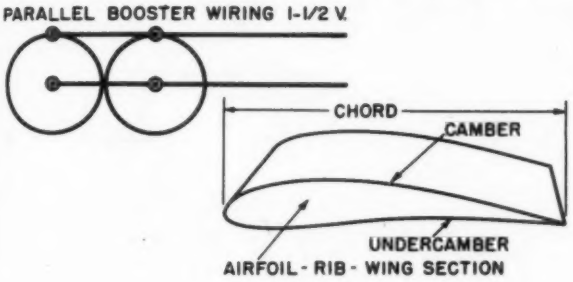


Rudder tab offset has two effects:
A = Makes model yaw about vertical axis, and
B = Makes model tend to roll about longitudinal axis, unless tab area is centered on axis.


8
Model turns in glide toward higher stabilizer tip
Tilted stabilizer most effective on lifting stabilizers & rearward C.G. locations —

Let's Get Started

If model building instructions seem to be written in Greek, jet-propelled dictionary helps translate the long-haired designers.



by I. N. STRUCTOR

► How often have you come across sentences like the following? "If the model exhibits strong stall tendencies, poor longitudinal stability is indicated. This is caused by improper decalage and engine offset angles."

Whad he say? Stall tendencies? Longi-whatinal? Decalage? Is that some new king swept-wing body style?

If you're baffled by many of the strange words you run across surrounding this model business—read on. Newcomers to modeldom soon discover there is a real language barrier before they can get in on the fun. Old timers sling around such terms as empennage and lateral instability that sound like gibberish to the uninitiated. Mag plans are filled with terms that are more puzzling than informative. This is all a very real part of model building and flying, inherited from big airplanes. This is, if you will, the language of flight. Many of the words have been handed down to us from other countries, hence their rather strange sound. Some terms have been transplanted from boats and ships because the part of the airplane and boat may be very similar. Many of the words are long and are generally used in abbreviated form. A good example is CG meaning "center of gravity." The abbreviation alone buried in the middle of a mag plan must appear to many like two lost letters looking for a word.

In order to give meaning to some of the more common model airplane terms the brief glossary here may open up the language barrier a bit. The list is by no means complete; there just isn't that much room in M.A.N.

AEROBATICS—Combination of "aero" and acrobatics. Stunt flying.

AILERON—Movable flap on wing trailing edge used for turn-and-bank control of airplane.

AIRPLANE—Flying machine, heavier than air.

AIRCRAFT—General term applied to all types, airplane, airship, helicopter, glider.

AIRFOIL—Cross section of wing sliced from leading to trailing edge. Also rib, rib section, wing section.

ASPECT RATIO—Relation of wing span to wing chord. Number of times span can be divided by chord, expressed, for example: 6 to 1, abbreviated A.R.

BACKBONE—Main top member of fuselage.

BALSA—That wonderful South American wood used in model building.

BANK—Turning flight with wings not level. Has nothing to do with money.

BEARER (ENGINE) Hardwood member for mounting engines, usually breaks in crashes.

BELLCRANK—Metal gadget used in yo-yos (control-line) to transmit control handle movement to model's elevators. Abbreviation: B'cr'k.

BIPLANE—A two-winger. Old fashioned, but coming back into style with modelers.

BILL OF MATERIALS—A list of what you have to buy in the hobby shop to build the model.

BOOSTER—Dry-cell battery used to make glow-plug glow to help start model engine. Two in parallel are better than one.

BULKHEAD—A former. Sheet balsa or plywood fuselage cross-members that support stringers, side frames or sheet sides.

CAMBER—Curve of airfoil outline from leading edge to trailing edge. Upper camber on top outline, lower camber on bottom.

CAP STRIP—Flat wood strip cemented to top and bottom edges of wing rib to support covering and strengthen rib.

CEMENT—A smelly syrup-like liquid used for assembling models. No relation to sidewalks or highways.

C.G.—Center of gravity. Spot where weight of model is centered. Modelers also call this balance point.

C.P.—Centre of pressure. Point on top of wing where lift is centered.

CHOKE—To block engine intake to draw fuel into engine to help starting. Too much will flood engine and prevent starting.

CONTROL-LINE—Type of model flying with wires attached to model so that it travels in circles around flier who remains in one spot.

COVERING—Paper tissue, silk, nylon, microfilm, Silkspan.

COWLING—Also cowl. Covering or part of fuselage around engine.

CRUTCH—Basic fuselage structure made up of two longerons and cross members.

CUBIC INCH DISPLACEMENT—Volume of engine cylinder included from piston top in up position to piston top in bottom position. Determines engine size and is used as basis for (*Continued on page* 48)

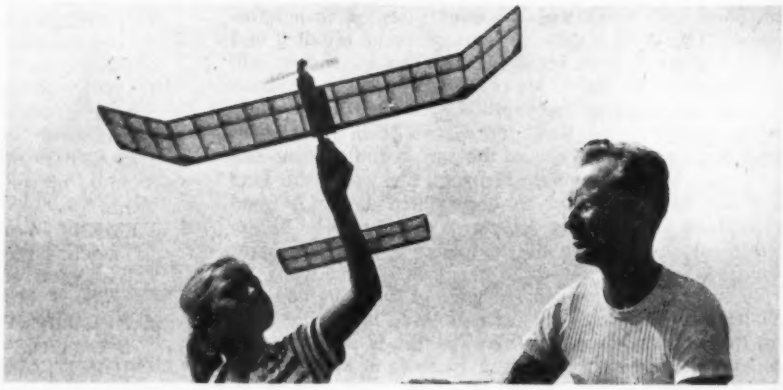
by RON ST. JEAN

Designer of America's most popular contest free-flight model—the Ramrod, presents a wonderful trainer. Takes the .049. You can build it.

When 10-year Sheryle wanted to build models, Pop tried kits but daughter went back to dolls. Result: the Tenderfoot, as simple as possible to build, yet strong enough for bashing around!

Getting ready to flip the Atwood, the intrepid aviatrix works like a vet. Below—Critical eye.

The Tenderfoot



► This model is the result of having a ten year old daughter, Sheryle, who wanted to build a model airplane. Anxious to have more than one modeler in the family, I hurried to the nearest model shop to purchase a kit designed specifically for the beginner. The results, however, were disappointing. The wood in the kit was so thin that it was difficult to handle and broke easily. Sheryle soon gave it up and went back to her dolls!

So the Tenderfoot was born. It was designed to be as simple to build as possible, to be rugged enough to withstand severe wind-ins, yet stable enough to insure the aforementioned phenomena occurs as seldom as possible! All of these goals have been achieved in the design, and it is highly recommended to anyone who wishes to get started in free-flight gas, with as few initial disappointments as possible. So if you fall in this category, put away those stamp books and hurry down to the model shop to buy:

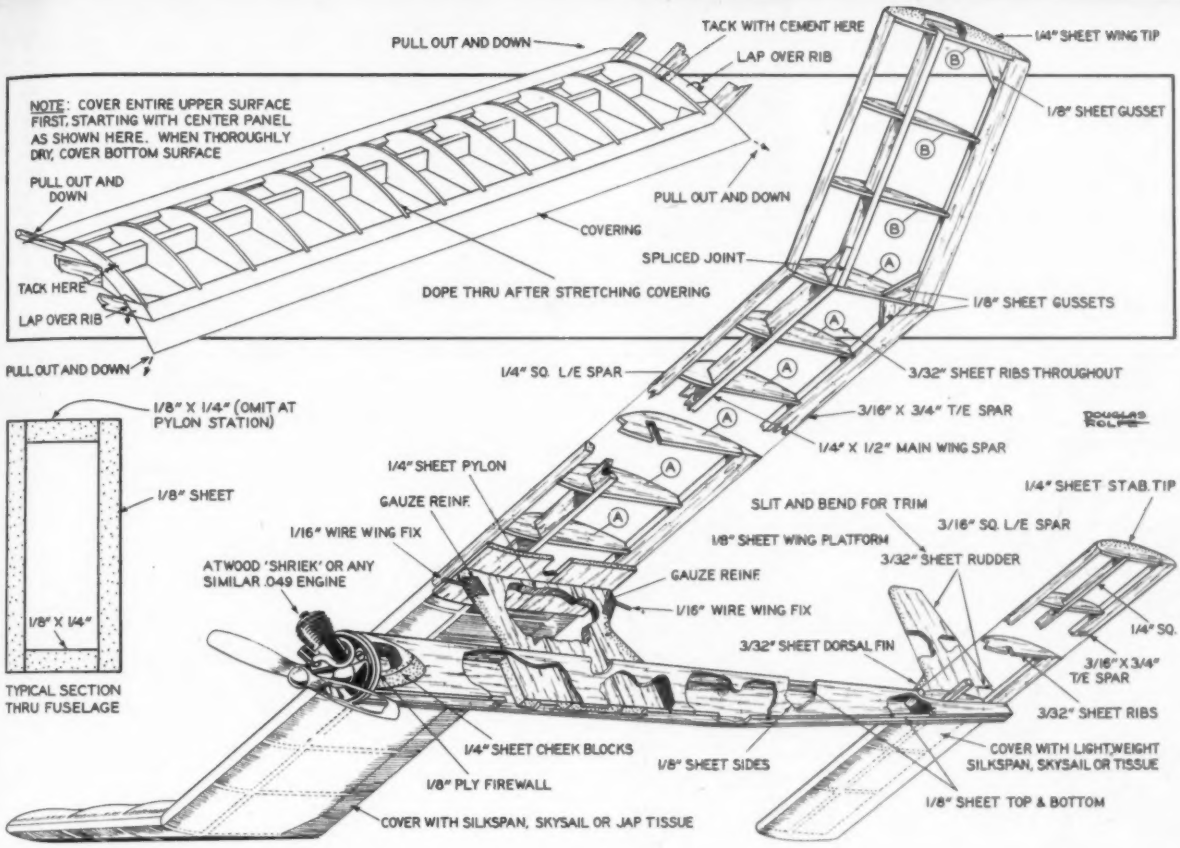
BALSA WOOD: 2 lengths, 1/8 x 1/4; 1 length, 3/16 x 3/16; 2 lengths, 1/4 x 1/4; 1 length, 1/4 x 1/2; 2 lengths, 3/32 x 3; 1 length, 1/8 x 3; 1 length, 1/4 x 2; 2 lengths, 3/16 x 3/4, tapered trailing edge stock; 1 small piece plywood, 1/8 inch thick.

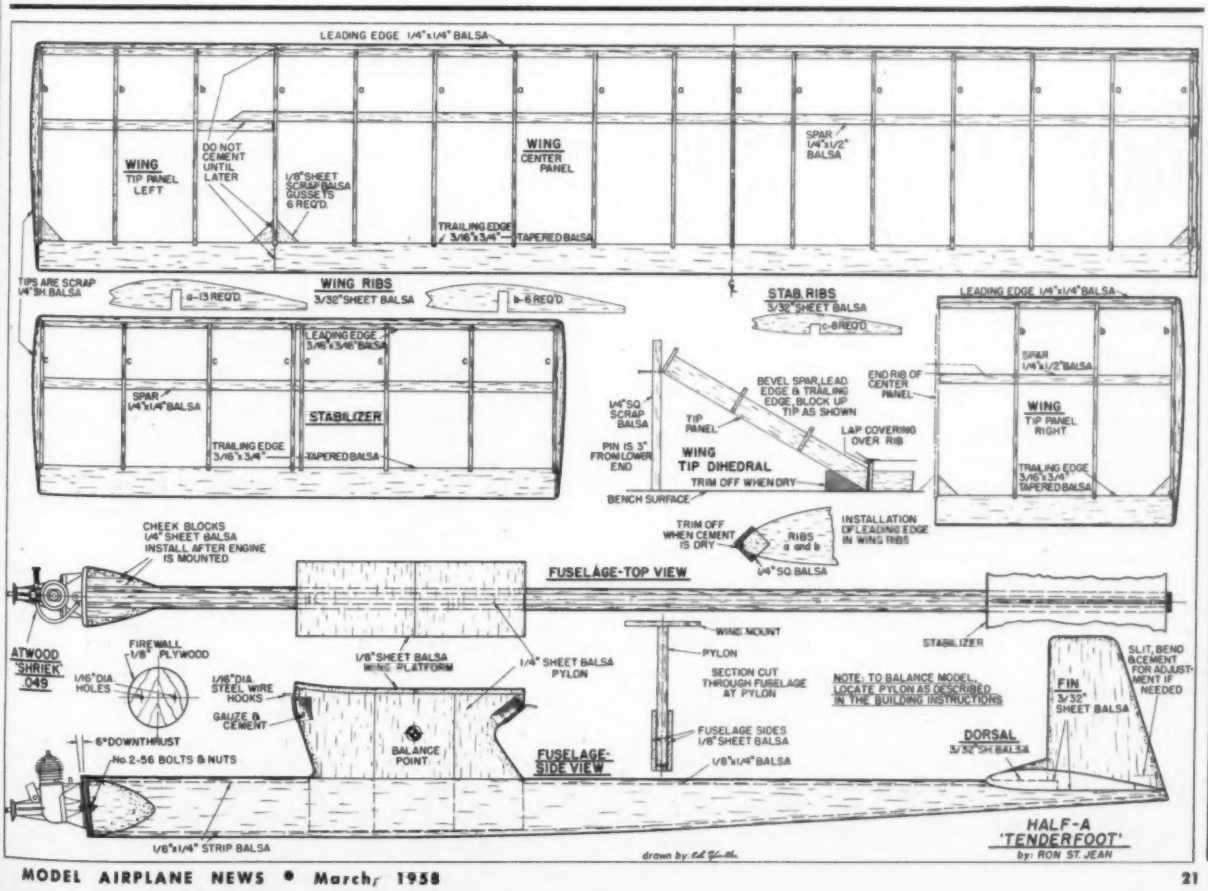
In addition to the above, several other items will be needed, such as cement, dope, covering material, etc. Your hobby dealer will be happy to point these out to you to help you get started.

Choose a flat, smooth and soft board to do your building on. If this does not describe your bench, perhaps an old drawing board will do the job. Plywood is not recommended since pushing a pin into it is difficult.

Let's start construction by building the wing and stabilizer. They are made the same, except that the wing has dihedral (the tips are raised), while the stabilizer, or "stab" for short, is flat.

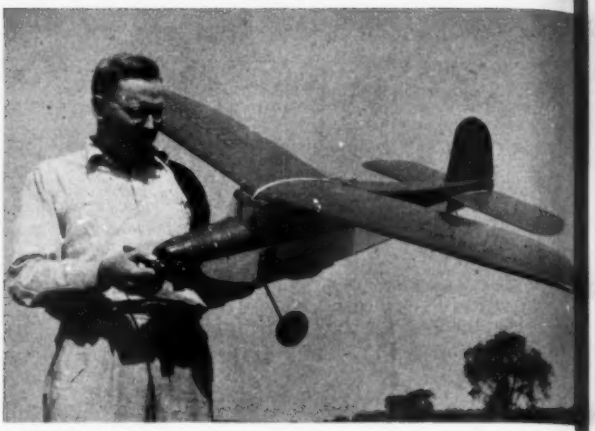
Begin by placing over the plan, a piece of waxed paper—the same type your sandwiches are wrapped in. This prevents your cementing plans to the wing while (*Continued on page* 42)


NOTE: COVER ENTIRE UPPER SURFACE FIRST, STARTING WITH CENTER PANEL AS SHOWN HERE. WHEN THOROUGHLY DRY, COVER BOTTOM SURFACE
PULL OUT AND DOWN
TACK WITH CEMENT HERE
LAP OVER RIB
1/4" SHEET WING TIP
1/8" SHEET GUSSET
COVERING
SPLICED JOINT
DOPE THRU AFTER STRETCHING COVERING
TACK HERE
LAP OVER RIB
1/8" SHEET GUSSETS
1/4" SQ. L/E SPAR
3/32" SHEET RIBS THROUGHOUT
3/16" X 3/4" T/E SPAR
1/4" X 1/2" MAIN WING SPAR
DOUGLAS ROLFE
1/8" X 1/4" (OMIT AT PYLON STATION)
1/8" SHEET
1/8" X 1/4"
TYPICAL SECTION THRU FUSELAGE
1/4" SHEET PYLON
GAUZE REINF.
1/16" WIRE WING FIX
ATWOOD 'SHRIEK' OR ANY SIMILAR .049 ENGINE
SLIT AND BEND FOR TRIM
1/8" SHEET WING PLATFORM
3/16" SQ. L/E SPAR
1/4" SHEET STAB. TIP
3/32" SHEET RUDDER
GAUZE REINF.
1/16" WIRE WING FIX
3/32" SHEET DORSAL FIN
1/4" SQ.
3/16" X 3/4" T/E SPAR
3/32" SHEET RIBS
1/4" SHEET CHEEK BLOCKS
1/8" SHEET SIDES
COVER WITH LIGHTWEIGHT SILKSPAN, SKYSAIL OR TISSUE
1/8" PLY FIREWALL
1/8" SHEET TOP & BOTTOM
COVER WITH SILKSPAN, SKYSAIL OR JAP TISSUE


LEADING EDGE 1/4"x1/4" BALSA
WING TIP PANEL LEFT
DO NOT CEMENT UNTIL LATER
1/8" SHEET SCRAP BALSA GUSSETS 6 REQ'D.
WING CENTER PANEL
SPAR 1/4"x1/2" BALSA
TRAILING EDGE 3/16"x3/4" TAPERED BALSA
TIPS ARE SCRAP 1/4" SH. BALSA
WING RIBS 3/32" SHEET BALSA
a-13 REQ'D.
b-6 REQ'D.
STAB RIBS 3/32" SHEET BALSA
c-8 REQ'D.
LEADING EDGE 3/16"x3/16" BALSA
SPAR 1/4"x1/4" BALSA
STABILIZER
TRAILING EDGE 3/16"x3/4" TAPERED BALSA
1/4" SQ. SCRAP BALSA
BEVEL SPAR, LEAD EDGE & TRAILING EDGE, BLOCK UP TIP AS SHOWN
END RIB OF CENTER PANEL
TIP PANEL
LAP COVERING OVER RIB
PIN IS 3" FROM LOWER END
WING TIP DIHEDRAL
TRIM OFF WHEN DRY
BENCH SURFACE
WING TIP PANEL RIGHT
TRIM OFF WHEN CEMENT IS DRY
RIBS a and b
INSTALLATION OF LEADING EDGE IN WING RIBS
1/4" SQ. BALSA
CHEEK BLOCKS 1/4" SHEET BALSA INSTALL AFTER ENGINE IS MOUNTED
FUSELAGE-TOP VIEW
ATWOOD 'SHRIEK' .049
FIREWALL 1/8" PLYWOOD
1/16" DIA HOLES
1/8" DIA STEEL WIRE HOOKS
1/8" SHEET BALSA WING PLATFORM
1/4" SHEET BALSA PYLON
WING MOUNT
PYLON
SECTION CUT THROUGH FUSELAGE AT PYLON
NOTE: TO BALANCE MODEL, LOCATE PYLON AS DESCRIBED IN THE BUILDING INSTRUCTIONS
STABILIZER
SLIT, BEND & CEMENT FOR ADJUSTMENT IF NEEDED
FIN 3/32" SHEET BALSA
GAUZE & CEMENT
6° DOWNTHRUST
No. 2-56 BOLTS & NUTS
BALANCE POINT
FUSELAGE-SIDE VIEW
FUSELAGE SIDES 1/8" SHEET BALSA
1/8"x1/4" BALSA
DORSAL 3/32" SH BALSA
1/8"x1/4" STRIP BALSA
HALF-A 'TENDERFOOT'
by: RON ST. JEAN
drawn by Ed Lidgett

FULL SIZE PLANS AVAILABLE. SEE PAGE 56.

Mouseniks ahoy! Al Secklin, Milwaukee, checks out his Hel-mitter, a no-hands, hand-held transmitter. Photograph, Benn Ollman.



Lazy Bones from MAN plans, a tried-and-true performer for Louis Chapman. Pic was taken by "Camera-in-the-Sky" Harrison Morgan.

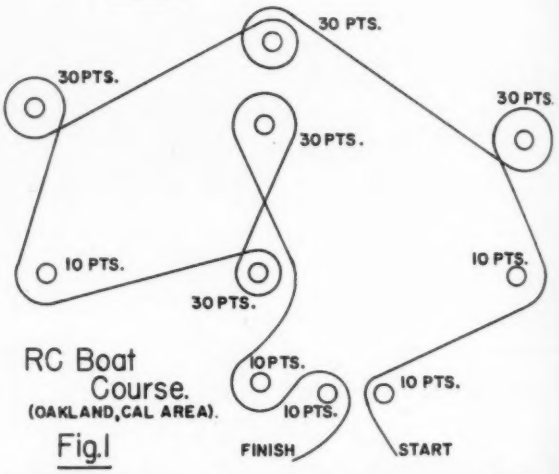


Fig. 1

Radio Control News

by EDWARD J. LORENZ

Lightweight receivers now are so small that you design an airplane to tote the servos.

► With widespread interest, especially in Europe, in the Stegmaier system we thought you'd be interested in photos of his unusual transmitter. It is compact, lightweight and is suspended from around the neck, to give above-waist operating height. The power supply is mounted on the lower deck; the RF section in the antenna area, and the audio and keying section just under the stick and pushbuttons. It operates from a 6v. car battery. Photos by Mr. Neidhart, Holland.

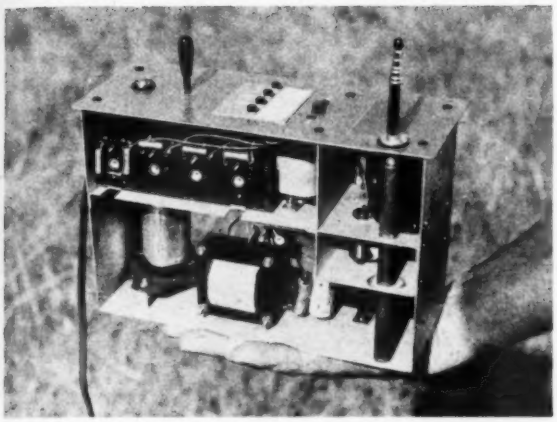
The EBRC Carrier club paper mentions possible interference from diathermy machines, which operate on 27.120mc. This radiation can cause trouble in the vicinity of hospitals, clinics, Army or Navy wards etc. The EBRC group advises that many members use their old RC equipment in RC boats. This is also a way to get that newcomer into radio work, eventhough he hesitates to build a plane. Give, trade, or sell him some old outmoded RC gear for a boat.

The New England RC Modellers, 50 Oxford Street, Auburn, Mass., have elected Abraham Anter, Pres., Harvey Thomasian, V.P., Herb Bentley, Sec., and R. Elliot, Treas., for 1958. Their 4th Annual N.E. RC Championships last fall saw Gerard Benoit take first in rudder only with a Rebel, K&B .15, original radio. Intermediate was won by Dick Ryan, Fox .25 L.W. Senior, original radio; multi-channel by H. Thomasian, Fox .25 powered L.W. Senior, Bramco 8-channel, deBolt servos. Pylon race and the Beauty event were sewed up by Lew Andrews and his Fox .35 powered X-Ray, Walt Good's TPTW radio. Wes Army took first in the novelty event with a Buzzard, powered by an Enya .19, Babcock radio. G. Benoit also took the spot landing event. Thomasian's Live Wire is six years old, goes through the full range of aerobatics and 500' of inverted flight. Bob Elliot won the 1957 championship with a Schneider Cub, K&B .35, Schmidt radio.

The RC/NC North Carolina group held 3rd anniversary meet, Burlington, N.C., last November. This group invites guest speakers, latest being Mr. J. Meares on CAA traffic control. This club has film on RC flying of interest to other groups.

From the Flight Line of the Modulator (Pioneer Radio Controllers, Palo Alto, Calif.) we find that Alex Schneider and Bill Stelmach really put on dog-fights, using paper streamers on their planes. Bill Hittenberger does mighty fine consistent flying using a simple escapement, a point to be remembered by the newcomers into RC. Bill often hands the transmitter to a bystander for a try at RC, proving the flying ability of his plane.

The San Leandro Channel Masters, Hayward, Calif. have a large perpetual trophy donated to them by the Sierra Electronic Corp., Menlo Park, Calif. This will be



The mighty Stegmaier's X-mitter: Power supply, consisting of the vibrator and transformer, are mounted on lower deck; stick, top.

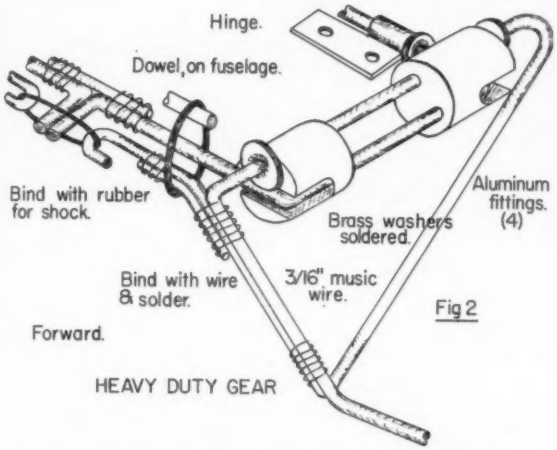
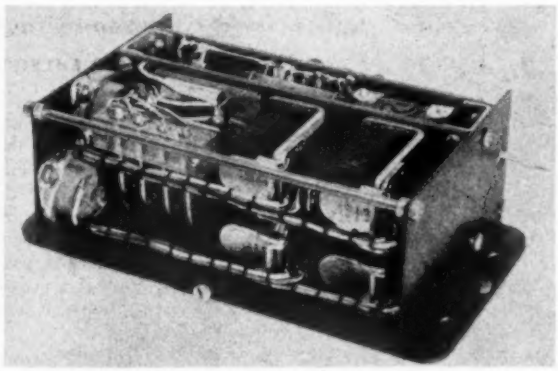
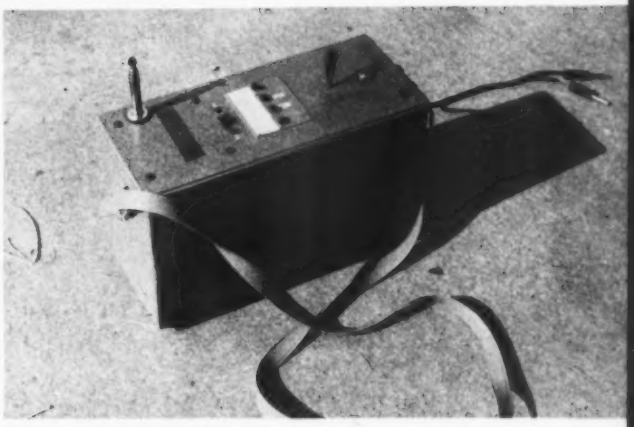


Fig 2



In August, 1957, C. H. Olsen, developed 10-ounce receiver for operation direct from 4.5 volts plus, 1.5 bias. Thin pen cells ran it continuously for 18 hours. Ten mil drain—20, relay pull-in.



Strap permits Stegmaier to hold transmitter at convenient waist level. Pushbuttons, four channels, control stick other four. On six volts.

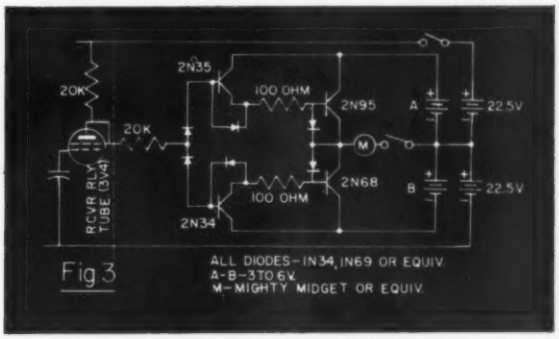
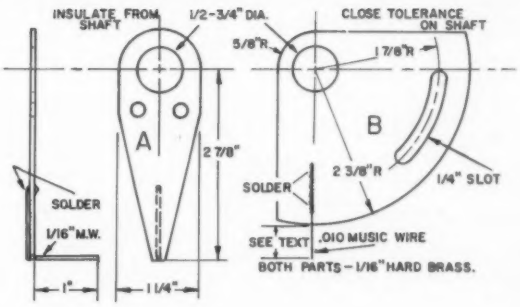


Fig 3



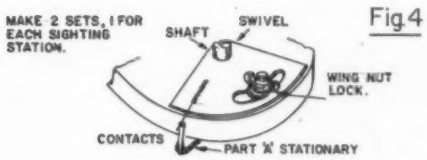
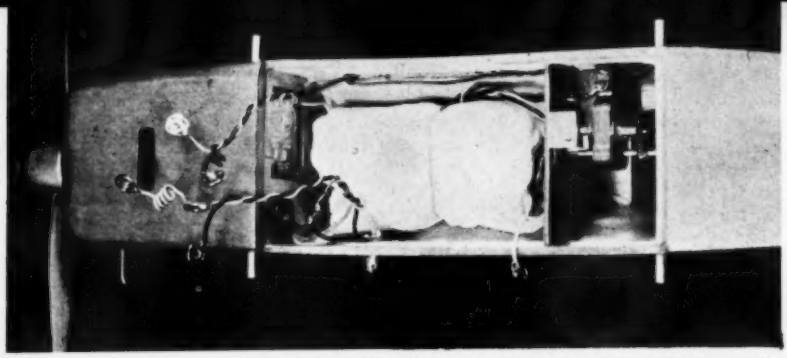


Fig 4

awarded to the winner of the annual competition in the expert class of multi-control. A point to remember from Channel Chatter, is to readjust your relay if you decide to solder the spring to the armature and/or bottom anchor. This would be applicable to the Gem type relay.

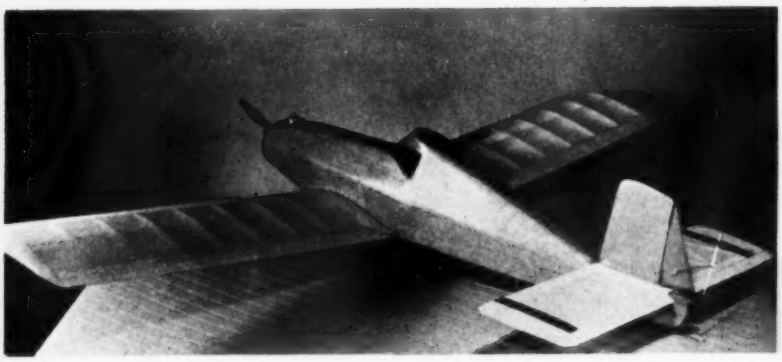
The Oakland California area RC boat fans use the course shown in Fig. 1. This is the precision course and buoys are placed about 20 yards apart. Gas and electric events are separate. Total points for a well executed run are 200. From the LARKS we learn Ken Willard has about rounded out the Astro series with his Astro-Piglet. This 23¾" job weighs in at nine ounces, sports the Deltron Micro tone receiver and is powered by the .020 Space Bug. This low-wing job has rudder and up-kick elevator. Other new RC jobs include an orange and black Heath Parasol (MAN) and a Great Lakes Sport Trainer, in addition to Howard Bonner's new red-and-yellow Astro-Hog, complete with a bust of the old maestro (with red cap) in the cockpit. The Larks have found that the LA traffic light system does not seem to (*Continued on page* 58)

Handling model, X-mitter together an easy job, as launching picture shows. Left-handed, too.



When you remove wing from fuselage, all the equipment is accessible. CG receiver, wrapped in.

Being a proponent of pulse, designer used the actuator shown. Escapements easily installed.



To make any model simpler than this, you'd be in the all-balsa ROG class. For anyone hoping to get into radio control, Westwind is a good starting point. Any good, lightweight receiver.

WESTWIND

by TED STRADER

Small models seldom fly realistically. One that does, and in wind, is this .049 powered job. It's as cute as a bug in the rug.

It's the general rule in RC to follow rather established lines to get the most satisfaction and success out of the hobby. Adherence to this theory has resulted in a majority of the fraternity flying high-wing type aircraft.

We must admit to agreeing many times with the unproved theory that low-wing configurations just couldn't cut the mustard because they would be too tricky; too unstable; or too something else. Then we decided to design a low wing and utilize some of this unstable characteristic with an eye toward stunt.

That's where something went wrong. We got a plane that would stunt but the Westwind turned out to be as stable as a table and has put to shame some of our solid-as-a-rock high-wing models.

The main drawback with this model is the limited receiver space. However, a great many of the available small commercial receivers and plastic boxed kit receivers will fit with ample room to spare. Our CG Electronics RT-1 gives us more than enough elbow room, even with a good-sized wrapping of protective sponge rubber. Bulkhead 3 keeps the receiver from wandering back to disturb the escapement.

There is plenty of battery room for any receiver that will fit, even if you fly proportional control. By using both the battery compartment behind the firewall and the center section of the wing we have installed as many as 11 pen cells and two Burgess U15 22½ v. "B" batteries.

The original model weighed 20 ounces, resulting in a wing loading of 13 ounces per square foot which is quite light for an RC model (at least for one of ours). It responds immediately and recovers like a high wing. The glide is flat and not too fast which makes for rather soft landings.

Before we begin outlining the construction, it must be admitted here that the original has had five of the most spectacular crashes we have ever seen. All were the result of either battery failure or pilot error (this flying at dusk can get hazardous!). Not one crash has been the result of the plane stalling or failing to recover. But what has been even more gratifying is that the plane is still flying. The only damage in that time has been one firewall which was split when a friend was running for a hand launch and stepped in a chuck hole. POW! The plane was flying the next day. The friend may never be the same!

Construction should offer no real problems. Except for the ribs and tips it's pretty much of a straight line proposition.

Cutting out all parts will save a lot of time before actual construction is begun. Shall we?

FUSELAGE: Once both basic fuselage sides are cut and checked for similarity, cement the doublers in place. Cut along bulkhead 4B location on the inside and crack slightly before any bulkheads are installed. Later when bulkhead 4B is cemented in place this will be as strong as any other part.

Cement bulkheads 2 and 3 in place and check for alignment. Once dry the basic framework can be com-

pleted with the addition of the firewall and other bulkheads. The escapement may be added later provided mounting holes have been provided before bulkhead 4B is installed. It may be well to have the torque rod all bent and install it as you install bulkheads 4B, 5, 6 and the tail block.

The correct angle to install 4T can be arrived at by pinning a straight piece to the tops of bulkheads 5 and 6 and bringing 4T into line until it touches. Once dry the back deck 1/16" sheet can be cemented in place, along with the forward angled side sheeting. When dry, sand until the 3/16" sheet top pieces will fit the sides and bulkheads flush. The cockpit top can either be an elongation of the back deck top or a separate piece installed later.

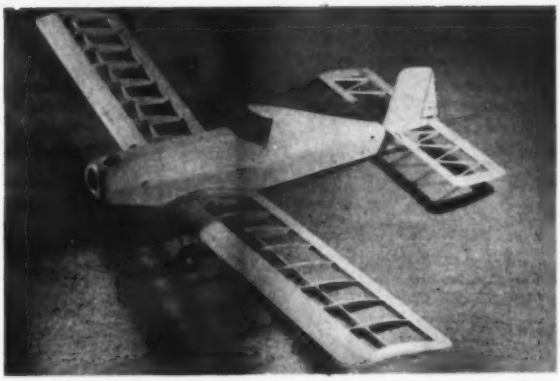
Sand the engine enclosure top as per plans to accept the 3/8" sheet and, when dry, sand to shape. Next cement the 1/4" sheet on nose bottom and, when dry, sand front to accept the 1/4" nose front. Cut out to suit engine used.

Once satisfied with the escapement or actuator picture, the rear bottom 1/16" sheeting can be cut and cemented. The tail wheel mounted to a piece of plywood and cemented in place and installation of the stabilizer rest of 1/16" balsa wraps up fuselage construction for a while.

WINGS: The most important consideration here is the selection of a good grade of fairly hard balsa. Construction follows the general procedure and has proven very strong and warp resistant. Construct both panels and the center section with the exception of adding the top capping to the main panels; the root section top and bottom capping and the center section top capping.

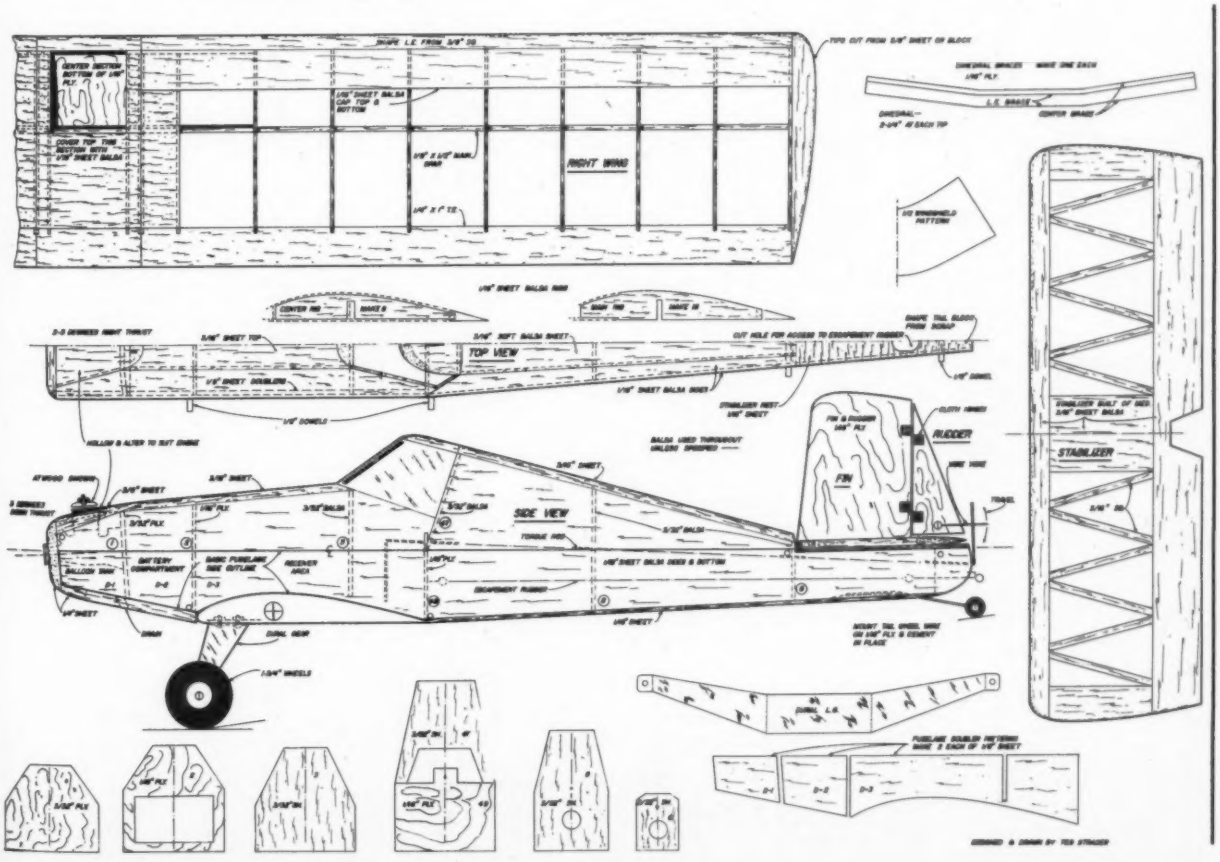
It is advisable to use plywood for the bottom of the center section, even if this opening is not used for battery space, because this provides a good mounting to bolt the landing gear to. Be sure to slant the root rib of each

(*Continued on Page* 38)



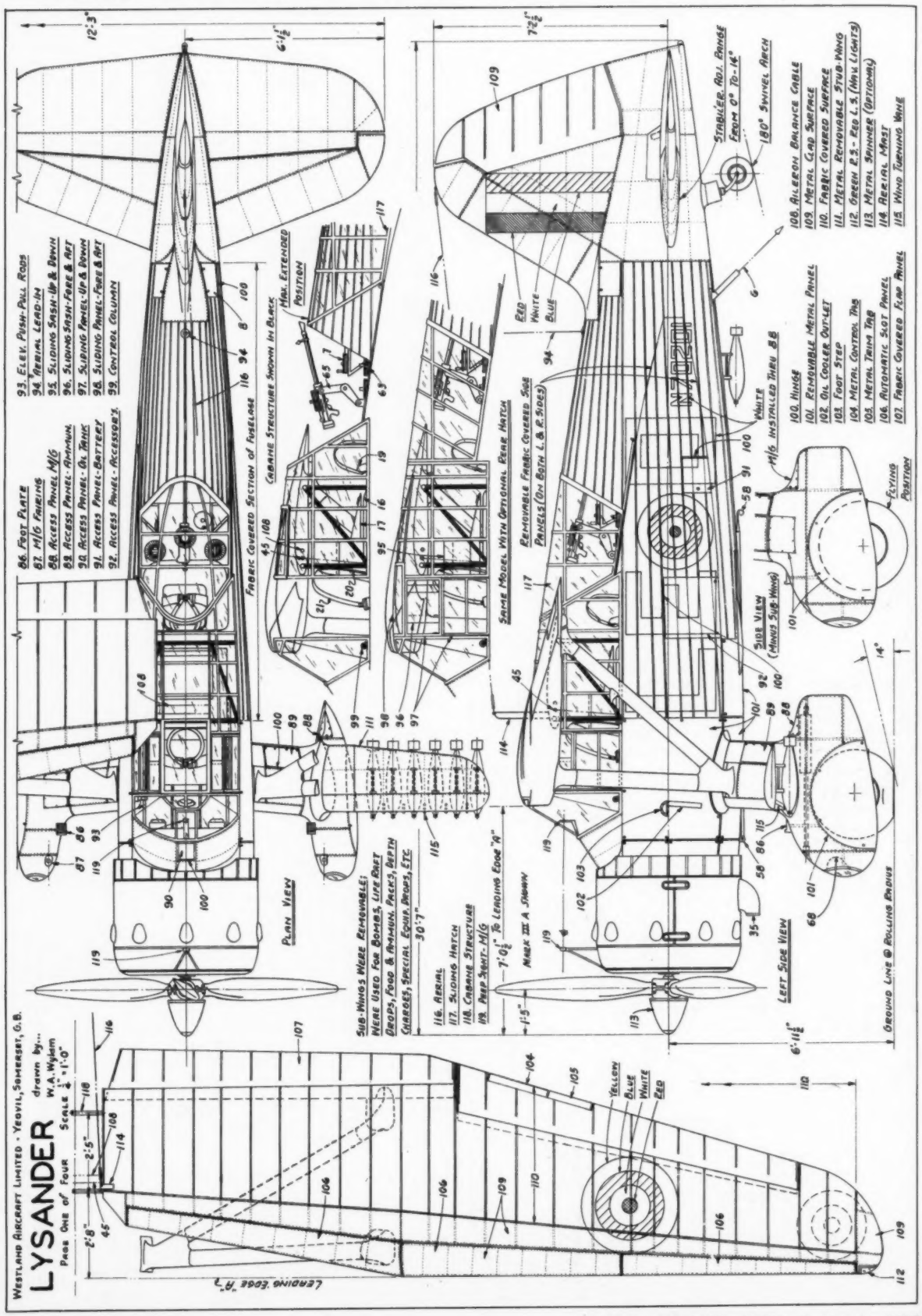
A minimum of pieces—but no legs, mind you!—indicate keen structural design. No need to go smaller; models should fly not flit.

An opening in top of center section of wing makes good place for the battery pack. Snap connects to in-wing antenna. Others are ok.

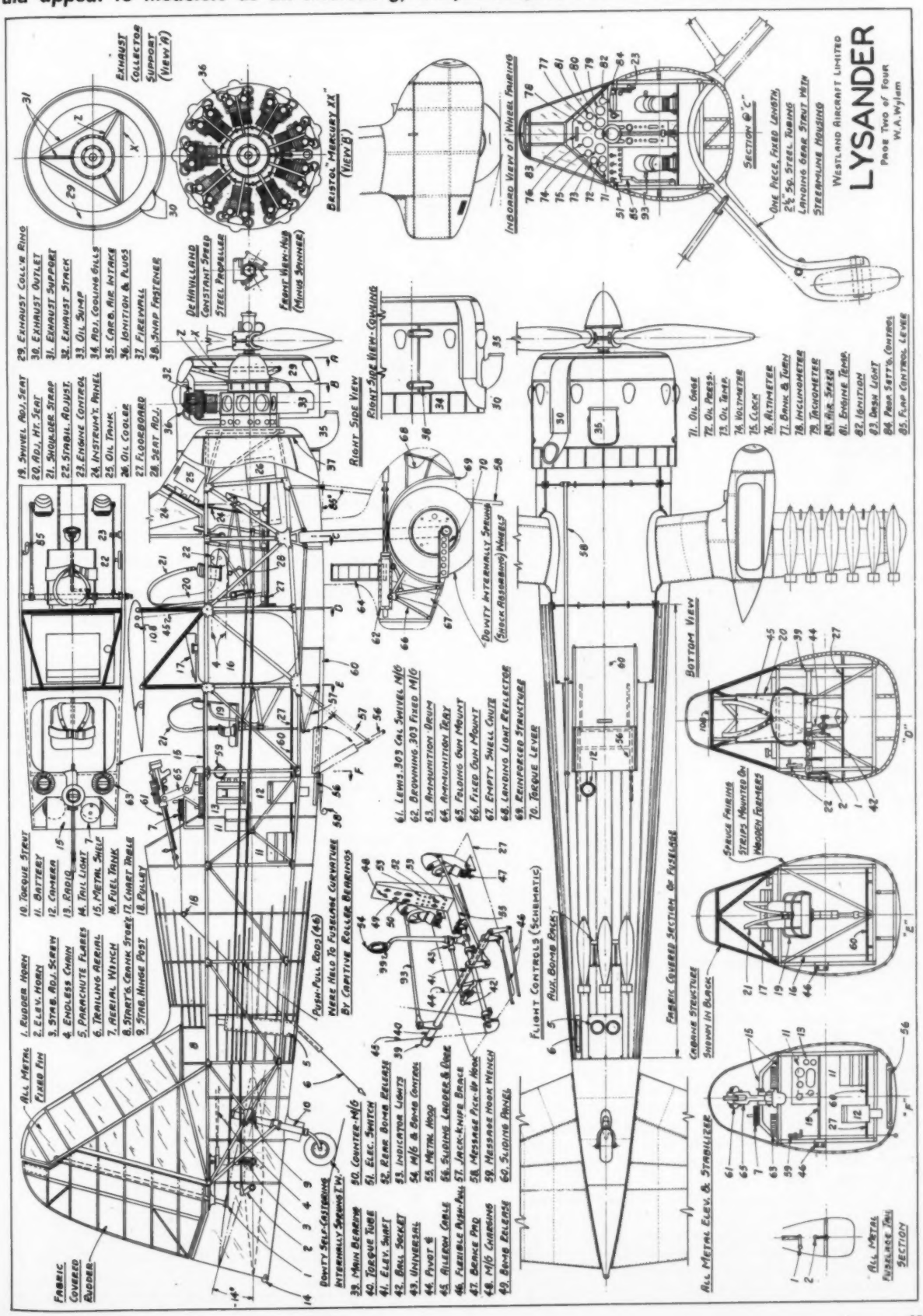


FULL SIZE PLANS AVAILABLE. SEE PAGE 56.

WESTLAND LYSANDER by William Wylam. Not a "famous" warbird of WW 2, the Lysander



did appeal to modelers as an interesting, unique subject. The first of two installments.



BIG D

The author with a Webra Mach 1 powered Big D. One unusual quality of the delta is its tolerance of power. Plans show a ship that will fly on an .049, and skyrocket upon the hotter .15.

A many times contributor on deltas to foreign magazines, the author-designer is a noted authority on the subject. With this design he shot for the highest performance.

by LAURIE ELLIS

► Big D is my 21st delta and is the third to use a pylon-mounted engine located at the apex of the wing. We were after contest climb and glide in the delta shape, or to match the pylon contest model. The delta is a queer bird. It has amazing stability, is more reliable than the conventional model but it is difficult to get a glide which will equal the orthodox layouts. This may be attributed to the fact that the span-loading is higher than on the ordinary model.

Hundreds of flights on all the previous designs dictated the shape of this delta. It is not pretty but performance makes up for it! It takes any engine from a good .049 to the hot .15's. Performance with an .049 will only be of the sport variety but with a .15, it comes into its own. Even with higher power, this model will not spiral in providing one does not get ham-handed on the trim. The transition from power flight to glide is very smooth and stall recovery is rapid and positive.

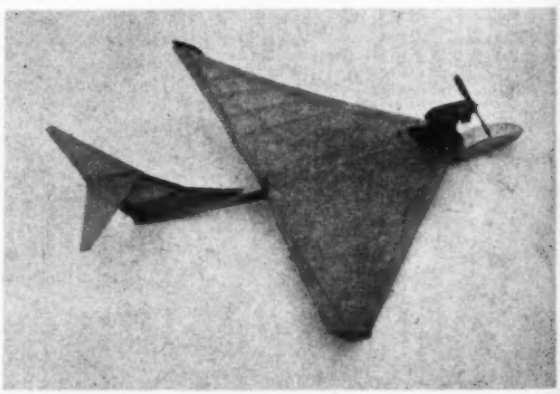
A" trike" landing gear is shown for those who want to ROG—not be used for contest flight. This model, because of its high thrustline, takes a long run to "unstick."

For those who wish to get away from the conventional, this design is a good start. Experimenters, with ideas of their own will have a proven design to modify.

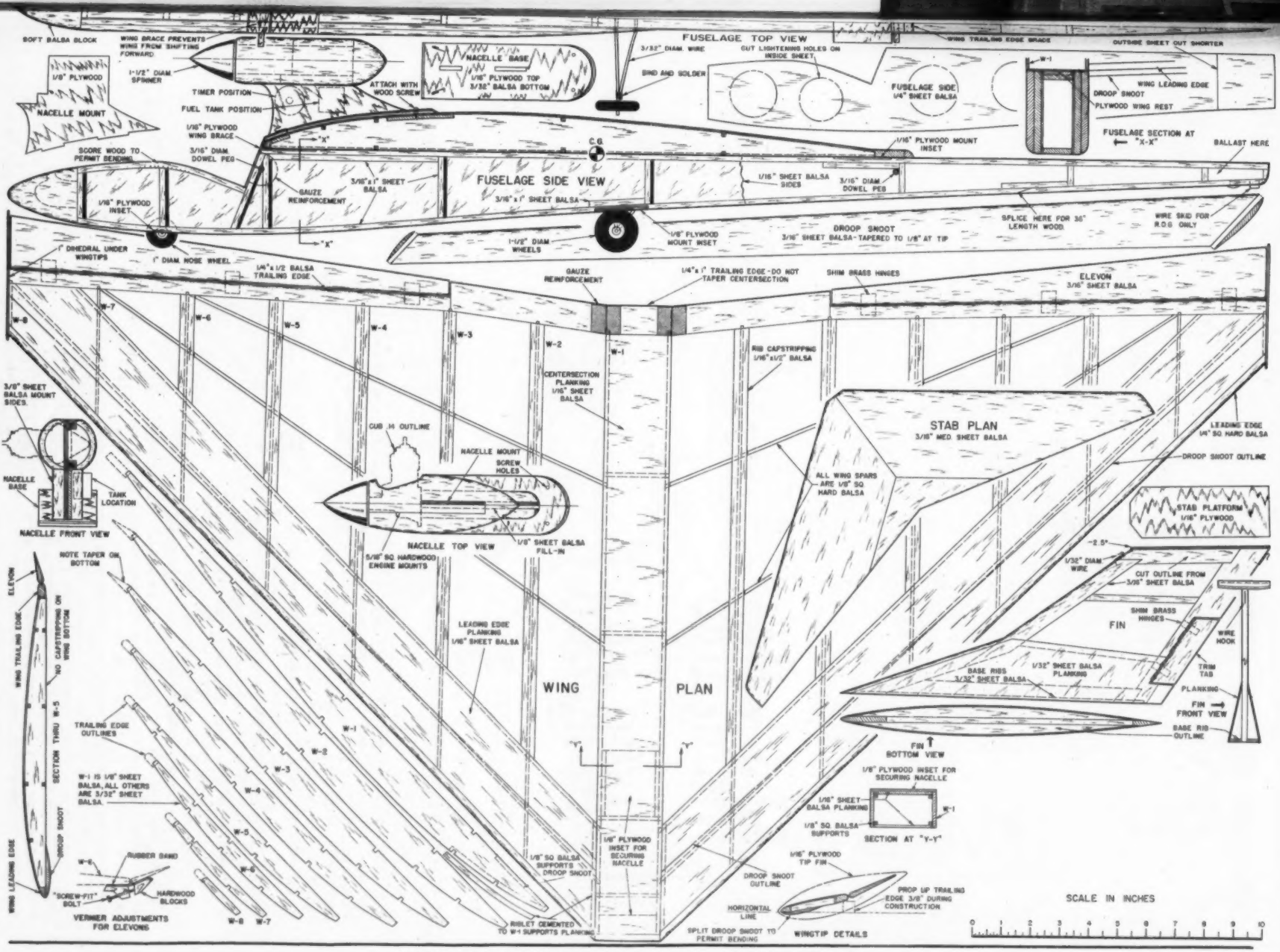
CONSTRUCTION: Trace all full sized parts on stiff paper for templates, making it easier to trace parts on balsa sheets. Rub the plans with wax or soap so that cemented parts will not adhere.

WING: The fuselage cannot be completed before the wing. All rib patterns are given. Slots for the ⅛ sq. spars are shown but remember, slots are slanted one direction for one side of the wing and the opposite direction on the other side. The slots shown on the plan are drawn as if there were no slant involved, therefore, it will be necessary to bevel each slot in the correct direction.

We found it best to cut out the rib shape but not put in the slots. When the ribs are assembled and cemented in place, we then lay the ⅛ sq. spars in place, one at a time, mark the position of the spar (*Continued on page* 52)



Shown in the pictures as the hand-launched version, model can be fitted with landing gear for ROG's, as is shown on the drawings.



FULL SIZE PLANS AVAILABLE. SEE PAGE 56.

This beats ten-cent rulers, wrapping paper, and optimism! Paul fancied his handiwork so much he decided to use board himself.

Make this Drawing Board

by PAUL E. DEL GATTO

To scale up plans you need a drawing board. Why not make one and save money?

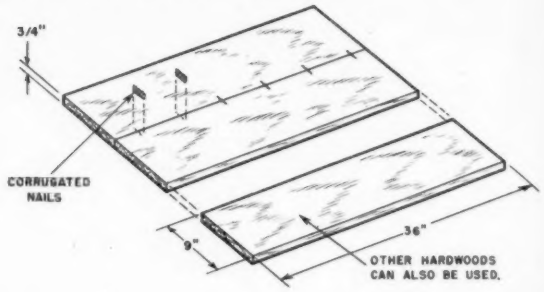
► Did you ever sit down at the kitchen table with a 10-cent ruler, soft pencil, and brown wrapping paper and attempt to scale up a three-view or some hot contest design? Many years have passed since we tried but the memory will never be forgotten.

Many modelers have the same problem today, namely, the need for drawing equipment—most particularly a drawing board. Good drawing boards and/or large drawing boards are not inexpensive. With this thought in mind we designed a simple but useful drawing board which would fit the needs of any model builder. In fact, it turned out so well, we now make ample use of it.

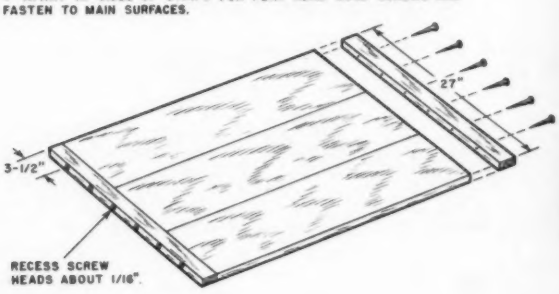
Basically, the drawing board can be made as outlined in the sketches; however, the size, both length and width, can be varied to suit your particular requirements. Should you prefer, you can make two or more in a variety of sizes. Even the method of assembly can be altered if you feel you have a better idea.

The board as shown can be made for less than $2, including the scrap linoleum top. To buy a board this large would cost as much as $10. And it would be no more useful than the one shown here.

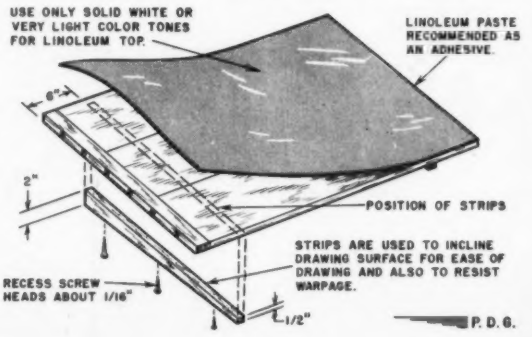
STEP ONE: CUT THREE PIECES OF PINE, EACH THREE FEET LONG, FROM A NINE INCH WIDE PLANK. JOIN THEM TOGETHER WITH CORRUGATED NAILS. AND TRIM ENDS FLUSH WITH EACH OTHER.



STEP TWO: CUT A 1-1/2" TO 2" WIDE STRIP OF PINE OF EQUAL THICKNESS AS THE MAIN SURFACES. THEN DRILL SIX UNDERSIZE HOLES 4" APART IN SIDES OF STRIPS FOR FLAT HEAD WOOD SCREWS AND FASTEN TO MAIN SURFACES.



STEP THREE: CUT TWO STRIPS TO FULL WIDTH OF DRAWING SURFACE, TAPERED FROM 1/2" TO 2" AND FASTEN WITH THREE FLAT HEAD WOOD SCREWS TO UNDERSIDE. A PIECE OF SCRAP LINOLEUM CAN BE CEMENTED PERMANENTLY TO DRAWING SURFACE OR JUST TACKED ON. (LINOLEUM OPTIONAL)


USE ONLY SOLID WHITE OR VERY LIGHT COLOR TONES FOR LINOLEUM TOP.
LINOLEUM PASTE RECOMMENDED AS AN ADHESIVE.
6"
2"
POSITION OF STRIPS
STRIPS ARE USED TO INCLINE DRAWING SURFACE FOR EASE OF DRAWING AND ALSO TO RESIST WARPAGE.
RECESS SCREW HEADS ABOUT 1/16"
1/2"
P. D. G.

MUSTANG PROFILE

NEW . . . SPORT AND COMBAT TRAINER

- **All parts fully shaped and pre-cut.**
- **Authentic full color decals.**
- **Complete hardware accessories.**

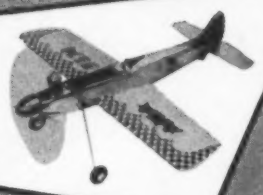
Patterned from the famous P-51D mustang Fighter. This great new controline model is tops for all around flying. Its beautiful finished parts fall together in a jiffy so that you'll have more flying thrill time than ever before! ONLY $2.95

FOR .074 .09 .15 ENGINES
21" WINGSPAN

CHECK-MATE

- **Complete colorful checkerboard de-cal trim.**
- **Satin smooth fully shaped fuselage and wing.**

A really complete kit including ALUMINUM COWLING, PLASTIC SPINNER, PLASTIC PILOT and HARDWARE ACCESSORIES. 16" wingspan. ONLY $1.95



by enterprise

HAWKER FURY—World Famous British Fighter — Scale Controline. Fully pre-fab for quick easy assembly. For .049 to .099 engines. 16" wingspan. 16" length ONLY $1.95

FAIRCHILD PT-19—U.S. Army Air Force Trainer. "Satin Smooth" shaped fuselage and wings, full color authentic decals. For .020 - .074 engines. 18" wingspan. $1.99

HAWKER TYPHOON—A lovely kit featuring pre-fab parts, full size detailed plans, large four color decals. For .09, .15, .19 engines. Wingspan 31½", length 32½". $2.95

SPACE TERROR—World's famous "TOWLINE TERROR" redesigned for double use—with .020 engine as sport free flight—or as towline glider— 24" wing span, 18" overall length ____ $1.98

SUPER LINER—The swell flying "Tow-Liner" now available for Pee-Wee .020 engine—or as a red hot towline glider. Completely pre-fabricated kit. 24" wing span 18" length ___ $1.99

SPITFIRE — The fighter that saved England from destruction. A beautiful miniature scale controline authentically recreated with loads of detail.
18" wing span $1.99

F6-F HELLCAT—Miniature controline of plane Navy says was the world's most maneuverable —watch how it flies!
18" wing span $1.98

L'IL DARLIN' — Super deluxe controline. With sleek, shaped fuselage, NEW recessed wing for L. G. mount. The sweetest looking, sweetest flying model ever. 16" wing span Only $2.98

CATAMARAN CRUISER — Water thrills galore with this unique model. The twin 26" hulls skim at 30 m.p.h. .020 - .074 Eng. Great value at only $2.98

PEE WEE SPORTSTER Great new ½ A Free Flight. Designed for .020 to .049 engines. Can operate in limited area
32" wing span $2.98

P-51 MUSTANG—Beautiful flight-scale controline model of famous fighter. This plane really flies! 18" wing span $1.98

P-40 WARHAWK — An illustrious fighting plane recreated as an outstanding controline model. Complete with "Tiger Shark" decals. 18" wing span $1.95

RAZZLE-DAZZLE — Sensational new design for terrific ½ A flying. Beautifully shaped fuselage and wing. Complete decal trim. 16" wing span $1.98

FOCKE-WULFE FW-190—A terrific scale model of the top rated German World War II fighter. 16" wing span $1.98

F4U-5 CORSAIR — Spectacular Navy shipboard fighter recreated into a realistic scale model. 18" wing span $1.99

CAUDRON RACER—Speed, looks, grace of this National Air Race entry recreated for new flying fun. A great model.
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SPAD — Eddie Rickenbacker's famous World War I fighter; This great "Bipe" will please anyone. A swell kit with complete authentic decal insignia.
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HOWARD "IKE" — Most famous of American Air Racers. Winner of Shell Trophy. Completely pre-fabricated. Best flying model in the Enterprise scale model line.
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SLICK TRICK—Miniature stunt-sport model that looks and flies like large stunters. An all-time Enterprise favorite.
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CURTISS HAWK P6-E—Famous Army Air Force pursuit plane of 1930's. A fabulous kit of a great Biplane. Complete with beautiful authentic full color decals. 14" wing span $1.29

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MINEOLA, NEW YORK

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THE *First* IN A HISTORY-MAKING NEW S[illegible]ES

$5.95

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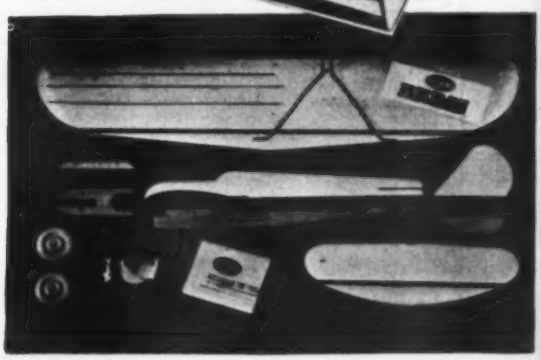
W S ES

TESTORS

FRESHMAN "29" U-CONTROL TRAINER PLANE

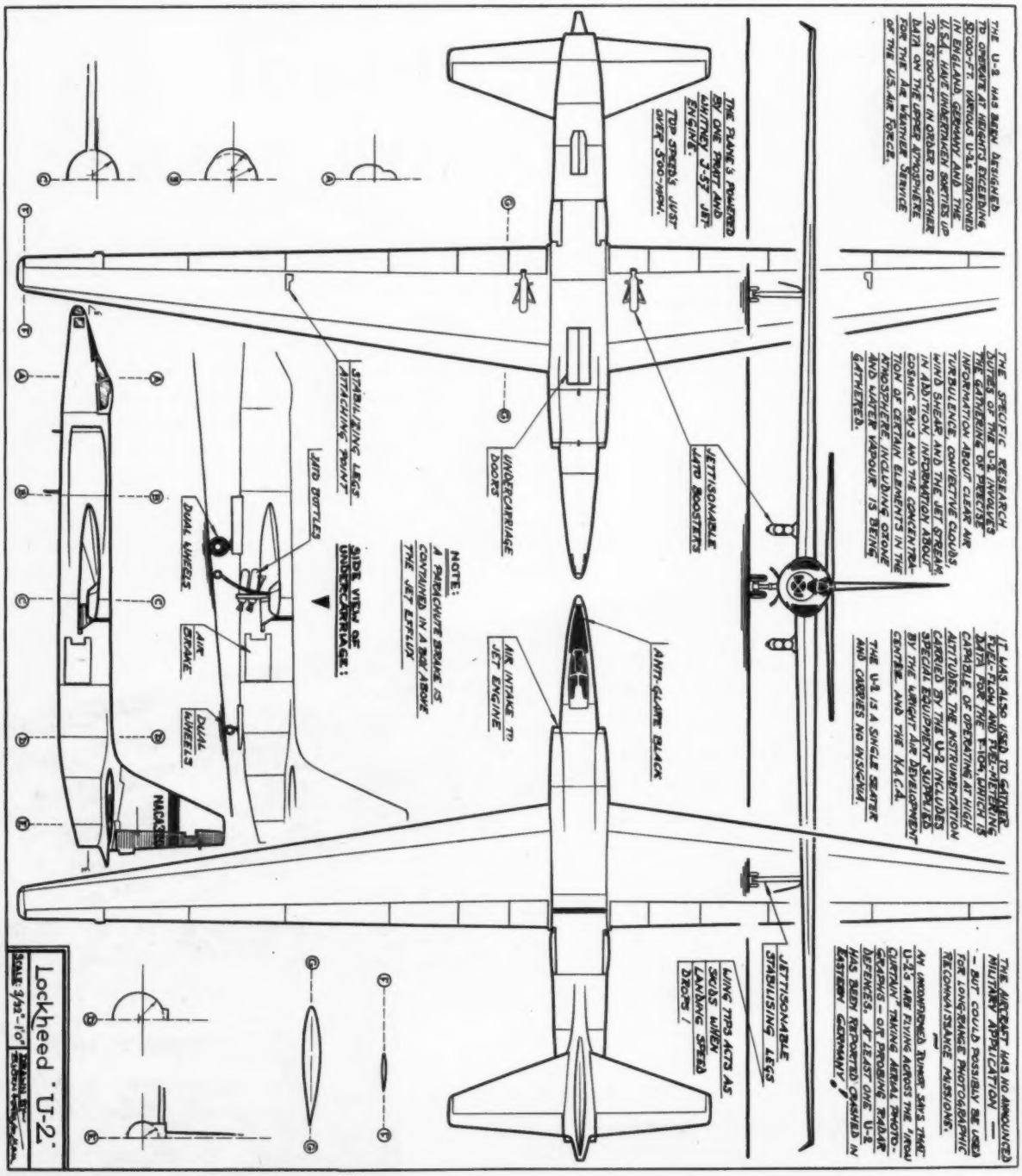
NEW! Testor's Freshman "29" U-Control Trainer Plane — designed for use with either the McCoy "29" or the McCoy "35" engines — is an outstanding kit for beginners. Construction-wise, there is no assembly problem whatsoever. All parts are completely shaped, hardware preformed, all holes drilled . . . the only tools required are pliers and screwdriver (not even a pocket knife), and screws are furnished. Because the engine mount and entire lower half of the fuselage are hardwood, sturdy structural frame-strength for withstanding shock and strain is an important feature of the plane. From the flight standpoint, too, Testor's Freshman "29" Trainer is ideal for the novice. It is easy to adjust . . . easy to fly . . . very stable . . . can be set to do simple stunt patterns. This plane has been developed in accordance with Testor's exacting standards for rated achievement levels of construction and performance, and is the first in a history-making new series. Buy it . . . fly it . . . now!



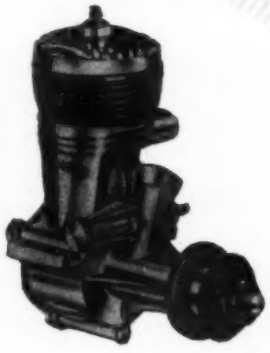
STORPORATION • ROCKFORD, ILLINOIS

Planes Worth Modeling—LOCKHEED U-2

Mystery plane? Built for flight at high altitudes, this amazing craft has been service flown in both England and on the Continent—according to foreign magazines. Speculation aside, makes a rare project.


THE U-2 HAS BEEN DESIGNED TO OPERATE AT HEIGHTS EXCEEDING 50,000-FT. VARIOUS U-2s STATIONED IN ENGLAND, GERMANY AND THE U.S.A. HAVE UNDERTAKEN SORTIES UP TO 53,000-FT IN ORDER TO GATHER DATA ON THE UPPER ATMOSPHERE FOR THE AIR WEATHER SERVICE OF THE U.S. AIR FORCE.
THE PLANE IS POWERED BY ONE PRATT AND WHITNEY J-57 JET ENGINE.
TOP SPEED IS JUST OVER 500-MPH.
THE SPECIFIC RESEARCH INTENDED FOR THE U-2 IS THE GATHERING OF PRECISE INFORMATION ABOUT CLEAR AIR TURBULENCE, CONVECTIVE CLOUDS, WIND SHEAR AND THE JET STREAM. IN ADDITION, INFORMATION ABOUT COSMIC RAYS AND THE CONCENTRATION OF CERTAIN ELEMENTS IN THE ATMOSPHERE, INCLUDING OZONE AND WATER VAPOUR, IS BEING GATHERED.
IT HAS ALSO USED TO GATHER ELECTRONIC INTELLIGENCE DATA FOR THE F-104, WHICH IS CAPABLE OF OPERATING AT HIGH ALTITUDES. THE INSTRUMENTATION CARRIED BY THE U-2 INCLUDES SPECIAL EQUIPMENT SUPPLIED BY THE WRIGHT AIR DEVELOPMENT CENTRE, AND THE N.A.C.A.
THE U-2 IS A SINGLE SEATER AND CARRIES NO ARMAMENT.
THE AIRCRAFT HAS NO ANNOUNCED MILITARY APPLICATION — — BUT COULD POSSIBLY BE USED FOR LONG-RANGE PHOTOGRAPHIC RECONNAISSANCE MISSIONS.
AN UNCONFIRMED RUMOUR SAYS THAT U-2's ARE FLYING ACROSS THE ARCTIC CAPTAIN TAKING AERIAL PHOTOGRAPHS — OR PROBING RADAR DEFENCES. AT LEAST ONE U-2 HAS BEEN REPORTED CRASHED IN EASTERN GERMANY.
STABILIZING LEGS ATTACHING POINT
SIDE VIEW OF UNDERCARRIAGE:
DUAL WHEELS
AIR BRAKE
DUAL WHEELS
HACKS
NOTE: A PARACHUTE BRAKE IS CONTAINED IN A BOX ABOVE THE JET EFFLUX
AIR INTAKE TO JET ENGINE
ANTI-GLARE BLACK
JETTISONABLE STABILISING LEGS
WING TIPS ACTS AS SKIDS WHEN LANDING SPEED DROPS!
Lockheed 'U-2'
SCALE: 3/32"-1'0"

FOR OUTSTANDING SERVICE



Recognition of Service
Award
To Torpedo .29
for 11 years of distinguished service; and as the first member of our long line of K & B Allyn famous engines; and for outstanding achievement in the model aviation field.
K&B Allyn

Since its inception 11 years ago the **Torpedo .29** has been the "pace setter" by consistently breaking record after record in every type of class B event—as set up by the Academy of Model Aeronautics. During its life it has achieved countless "firsts" in U-Control, Free Flight, and Radio Control proving its versatility and reliability.

There is little doubt that from the beginning this great .29 was years ahead of its time as shown by its popularity over the years and even today. Over 250,000 Torpedo .29s have now been sold, and in keeping with our policy of improving the line we have decided to give "old faithful" the *new look* now so familiar in our other Torpedo engines.

In its place we now present...

the TORPEDO .29S

This *power packed* **.29S** not only includes the new look but provides:

- **Greater Performance**
- **Smoother Running**
- **Easier Starting**
- **Heavy Duty Crankshaft**
- **Genuine Meehanite Piston**
- **Forged Aluminum Connecting Rod with Bronze Bushing**
- **New Cylinderhead Design for Better Combustion**

and many other outstanding features to make it the best all around .29 for Free Flight, Scale, Stunt, Team Racing, and Radio Control.

$15.95

Look for the familiar Green Head

Ask for the *new* **TORPEDO .29S.**

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CHOICE OF CEMENT IMPORTANT: KIRN

Famous Speed Flier Always Uses Ambroid

"Speed planes often take a brutal beating, so it pays to use the very best liquid cement made. That's why I always use Ambroid," says Dale Kirn, speed king from Salina, Kansas.

And Kirn, after 20 years of flying, speaks from experience. He started building planes at 6, and at 18 won first place in Senior Flying Scale at the Nationals — then repeated the following two years! A former member of the USAF Model Airplane Team and winner of more than 100 trophies, he now flies with the Clem-Beasley-Kirn Speed Team.

The photo above shows Kirn with his "Shock Wave," built from his own design (with Ambroid, of course). In 1955 this sleek ship won First at the Nationals (162.83 mph), first in the Southwest Championships (161.07 mph) and First at the King Orange Internationals at 166.60, then a new record.

"I insist on the best of everything for my planes," Kirn says. "That means Ambroid, especially when I'm working with hardwood. It penetrates deep, forms an amazingly strong, shock-resistant bond. Flights over 160 mph put a lot of strain on a ship—but Ambroid can take it!"

AMBROID

Take a tip from Dale Kirn and build stronger, faster planes with AMBROID. A ship can't be stronger than the cement that holds it together — and AMBROID is the strongest cement made. Flexible, waterproof, hot fuel resistant, too!

1¾ oz. tube 30c
4 oz. tube 60c

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AMBROID CO., INC.
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P. G. F. CHINN

FOREIGN NOTES

A monthly world-wide round-up of technical developments, designs, significant industrial products.

GREAT BRITAIN

Since its first flights, reported in our November issue, Col. Taplin's "world's first" electrically-powered RC model has undergone a number of small modifications, including the fitting of a new transistorized receiver, the effect of which has been to reduce weight by more than a pound and to improve performance considerably.

Another new Taplin innovation is a .40 cu. in. twin-cylinder Diesel. As is well-known, German expert Karl-Heinz Stegmaier uses a twin-cylinder Ruppert Diesel of similar displacement and this same design now also appears to be finding favor with other leading European RC exponents. However, unlike the Ruppert, which is a simultaneous firing flat twin, the Taplin is an inline, alternate-firing design. It has a three ball-bearing shaft and an unusual degree of speed control. It is hoped to have the engine in production shortly and both aircooled and watercooled versions are expected.

CZECHOSLOVAKIA

When Gibbs of Great Britain set his .15 cu. in. class world record of 225 km.–hr. in Florence in the fall of 1956, we opened in this column, that this mark, equal to 139.8 mph, would not easily be beaten, but we reckoned without the Czech MVVS 2.5–1957 racing .15 then not in existence. Only four of these motors were made and they placed 1, 2, 3, and 5 in the 1957 World Championships. Not content with this, Czech "Master of Sport" Josef Sladky, has now flown one of these motors at a staggering 236.18 km.–hr., or 146.76 mph. It is interesting to note that this is about 40% higher than the speeds that were realized five or six years ago when the FAI .15 cu. in. speed class first claimed attention.

In another recent Czech record attempt, Jan Hajic, leading Czech radio-control modeler, flew his model for 22 minutes to set a new national RC duration record. He used radio equipment of his own construction and a .35 cu. in. MVVS 5.6–1957 motor.

AUSTRALIA

Noted Australian modeling writer, Jim Fullarton, has put forward a suggestion for an unorthodox type free-flight gas model to meet the 1958 FAI rule requirements. Proposal is for a high-thrustline pusher. The fuselage is hatchet pattern but with an extended nose to carry ballast. The engine is mounted atop the wing center-section and drives a pusher prop. Twin fins are used on a low positioned stab and slipstream is thereby directed clear of the model to reduce drag.

An objection to this type of layout, formerly, was the impossibility of building a serviceable model down to the minimum weight allowed by the rules, due to the need for nose ballast. With the 50% weight increase required under the new FAI rules, however, this no longer applies.

Jim Fullarton is noted for his original ideas and readiness to experiment and another out-of-the-rut design of his was recently described in the Australian magazine Aircraft. Built by Max and John Fyfe, this is a pusher canard flying-boat of 48-in. span and 25-in. length and is fitted with a British Allbon Javelin .09 Diesel. Stabilizer (at the front, of course) is sharply dihedralled, while stabilizing floats are mounted aft on the wing which has endplate fins. Stability on the water is said to be very good.

BELGIUM

Two new world RC records have been claimed on behalf of the noted Belgian RC experts, Dr. Gobeaux and son Jean-Pierre. The first, for distance and controlled from a moving car, beat Vern Kroamer's U.S. record by 3⅛ miles for a new mark of just over 8 miles. The second record, set up two days later, was for duration and resulted in a new time of 4 hours 27 min.

EAST GERMANY

In the July '56 Foreign Notes, we described a variable incidence wing set-up by East German free-flight champion Hans Neelmeijer. The system, using pawls and levers enclosed within the pylon wing-mount and operated by a timer, was designed to eliminate looping tendencies in the climb, while maintaining an efficient angle of attack in the glide.

Neelmeijer has now proved his system by winning the Hungarian free-flight championships with a model so equipped. The model, built to the pre-1958 FAI formula, was powered by a Schlosser .15 cu. in. Diesel and totaled 14:41 out of a maximum possible five-flight total of 15:00. Rigging angle of the wing was at zero during the climb, increasing to 2 deg. for the glide.

NORWAY

Lately received from Norway, for the boat fans: two very nice marine drive assemblies which may shortly become available on the U.S. market. Basically, each consists of a 1-15/16-in. dia. diecast alloy prop and a 13-in. length of 4 mm shaft, with separate double universal coupling to the engine flywheel to simplify engine mounting and alignment.

For standard type installations, an 8 mm o.d. full-length brass sterntube is provided. For fast boats, however, there is an open shaft arrangement, featuring a polished cast alloy bracket and skeg, for transom attachment, which incorporates a horizontal bearing with non-metallic bushing and thrust face. The prop is then mounted on a short bronze shaft by a universal joint. All moving parts are quickly detachable for servicing without disturbing the engine, the prop being attached by a grubscrew for which the appropriate Allen key is provided.

HUNGARY

A team of five speed and stunt experts from Budapest visited Brno, Czechoslovakia, for the 2nd "Brno-Budapest" C/L contest. There were five classes, in which, in accordance with usual East European practice, one contestant only from each country could enter. In the .15 cu. in.

(*Continued on page* 38)

TOP FLITE GAS KITS ARE TERRIFIC!

each is an outstanding value in its class!

these two beauties were designed by George Aldrich, America's greatest stunt champion!

FLITE STREAK

Combat or Stunt Trainer

Kit No. N-2

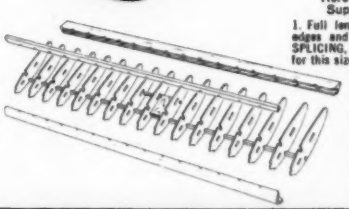
$3.95

SPECIFICATIONS:
Wing Span: 42 in.
Wing Area: 390 sq. in.
Length: 28 in.

Engine Sizes: .15 to .35

Here's Why It's a Superior Model:

1. Full length leading, trailing edges and spars. Require NO SPLICING, an exclusive feature for this size and type of model.



2. Assembly is easier, faster—with perfect alignment.

3. This Jigtime construction of notched spars, leading and trailing edges allows you to construct a symmetrical wing on a flat surface without special jigs, also making it warp resistant.

the NOBLER

Championship Control Line STUNT MODEL

Kit No. N-1

$8.95

1957 WINNER Nationals Open Stunt (National Stunt Champion)

the "Winningest" Stunt Model Ever Flown!

1956 WINNER Nationals Open Stunt
1956 WINNER Nationals Senior Stunt (National Stunt Champion)
1955 WINNER Nationals Senior Stunt
1954 WINNER Trinidad Nationals Stunt
1954—3rd in Nationals Open
1954—3rd in Nationals Senior
1953 WINNER Nationals Senior Stunt
1952 WINNER Nationals Stunt
1951 WINNER International Stunt

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Each kit contains: formed landing gear, push rod, elevator horn, wheels, bell crank, firewall, decals, and all necessary hardware. All parts are completely finished. Only select Grade-A balsa is used. Full size detailed plans with many step-by-step construction features making it easy to build and fly furnished with each kit.

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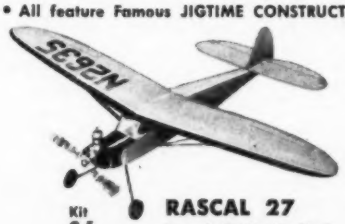

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speed class, between Czechoslovakia's Miroslav Zatocil and Hungary's Gyula Krizsma Zatocil (MVVS motor) returned 130.48 mph to win by three mph. The .30 class went to Czech record holder Bohumil Studeny with an excellent 144.79 mph (MVVS motor) displacing Erno Horvath of Hungary (McCoy 29) by 13.58 mph.

In the .60 class, the Czechs and Hungarians have yet to achieve the high speeds they habitually demonstrate in the smaller categories and Lubomir Koci won at 139.8 using a McCoy 60. In second place, Hungary's Joszef Versits recorded 124.27 mph with a Super-Tigre G.24 powered ship.

The jet class gave the Hungarians their only win, but a good one, at 151 mph, by Gyorgy Toth. The stunt event was between Hungary's Karol Fischer and Czechoslovakia's Josef Formanek and both contestants had two flights each, but the expected Hungarian win failed to materialize, due to trouble on Fischer's first flight. Although he went on to amass 80 points more than Formanek in the second round, the latter won on aggregate with a 46 points lead.

Great Britain

British speed man, Ray "Gadget" Gibbs, set up a new British record of over 152 mph on November 16 last for the 5 c.c. (.30 cu. in.) class, beating his own record by six mph. As usual, he employed one of Fred Carter's custom specials for the attempt. Whether or not this will be accepted as a new world mark, would appear to depend on whether the Czech claim (reported last month) of 151.6 mph, is ratified by the FAI.

Expected shortly from International Model Aircraft Ltd., manufacturers of the 'Frog' line, is a new .06 cu. in. Diesel. This will be similar to the existing .09 cu. in. "150" model, but with a high specific output and something new in radial bypass design. In this, a very thick liner wall is used, in accordance with current trends. This has permitted the usual bypass flutes or slots to be replaced by three pairs of 3/32-in. dia. vertical passages drilled up through the actual cylinder wall parallel to the cylinder axis. An annular groove below the exhaust belt connects the passages with the interior of the cylinder.

Another Frog design which is expected to see production during 1958 is the "349", a .21 cu. in. Diesel, the prototype of which we have recently been testing for the manufacturer. Intended primarily for combat flying, this is a rugged and unusual motor featuring a drum type rear induction valve of unique design and a loop scavenged cylinder with inclined bypass ports. The crankshaft is carried in a single ball-journal bearing, supplemented by a plain outer bearing. The front housing is heavily webbed and an expendable prop retaining stud is featured.

Westwind

(*Continued from page* 24)

panel to allow for dihedral.

Once these basic parts have been constructed they can be joined and the dihedral checked. When dry, the rest of the capping can be added, the 3/8" square leading edge shaped and the tips added.

TAIL SECTION: Geodetic design was used on the stabilizer because of its resistance to warps. The rudder sometimes takes quite a bit of strain on nose overs and therefore plywood is suggested here.

Regardless of the hinge arrangement, make certain they work freely. They

should be free enough to allow the rudder to flop from side to side when the rudder is tilted back and forth. The wire yoke works fine in arriving at the proper rudder throw.

FINISH: Once sanded, the entire plane was given two coats of clear dope preparatory to covering. Sand off the raised particles of balsa and you are ready to cover.

We used GM Silkspan on the fuselage and silk for the rest of the open framework. Three thin coats of dope on the papered fuselage and four on the silk seemed to do the trick.

If regular nitrate dope is used and a glow engine is installed it will, of course, be necessary to add a coat or two of hot fuel proofer.

At this time we installed the hold-down dowels and parts necessary for the radio gear, plus the dural landing gear and celluloid windshield.

FLIGHT TRIM: Powered flight on escapement control will necessitate the need for about two or three degrees of right thrust to counteract torque. The three degrees down thrust necessary, regardless of what you use to wiggle the rudder, is built in. We might add that the side thrust can be built in, too, by lengthening double D-1 and shortening double D-2 on the right side of the fuselage by about 3/32".

When satisfied there are no warps (and, incidentally, there is no washout in either tip) and the plane balances where shown on the plans (or a bit forward) you are ready to try a glide or two. We say a bit forward meaning that a low wing model can stand to be nose heavy more than it can tail heavy.

A gentle run and an equally gentle thrust of the model should result in a very smooth flat straight glide of about 30 to 40 feet and if the wheels are aligned and free and straight, should roll straight as an arrow. Don't be alarmed if upon touching ground it takes off again, for this is common. However, it should make a gentle arc and recover to a smooth wheel landing. If it shows any tendency to do otherwise there is a possibility it's a bit tail heavy and is stalling slightly.

During the above tests it is necessary to have all batteries installed. However, because the receiver is housed directly above the center of gravity, you can leave it out until the tests are completed.

Now you are ready for powered controlled flight (stop squirming).

Those using escapements should adjust the rudder throw to give about 3/16 to 1/4 inch movement. Proportional fans can use a little more, say about 3/8 to 1/2, as we do.

As you observe the reaction of the plane, you can further adjust the wire yoke to suit your needs.

Those familiar with the CG Electronics RT-1 receiver and the CG T-12 tone transmitter, will know the combination is not set up as is for proportional control, but our pulser was in the shop undergoing major surgery and we continued to fly by pulsing by hand. It's rough on thumbs but the stability of the Westwind allowed us a few missed pulses and still came out ahead of the game.

One final note on launching. Don't be afraid to give it a healthy heave. We have one fellow here who throws models like he was out at the center field wall trying to put out a runner at home plate and he hasn't yet even ruffled a feather on the little ship.

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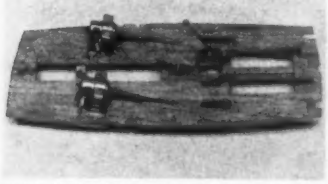

Made by Aristo-Craft, this always dependable Power Unit fits snug as a-bug-in-a-rug into Ideal's popular Wheeler Cruiser. Ready-to-Run, it has Twin Motors, Battery Holders, Switch and Universal Couplings. No Soldering, No Wiring, No Cutting is necessary...this powerful unit is really ready-to-go...all the way! 3.95

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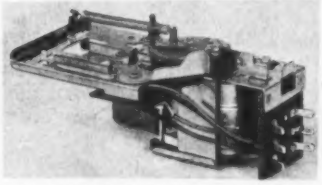

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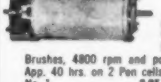

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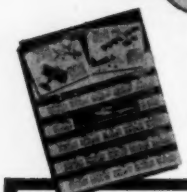

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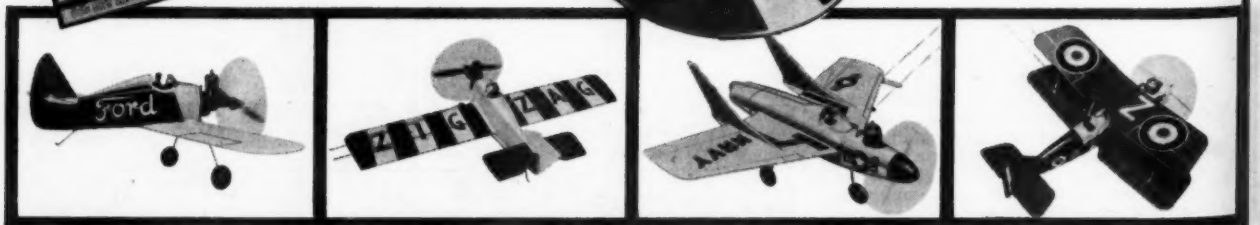

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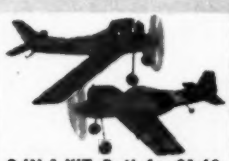

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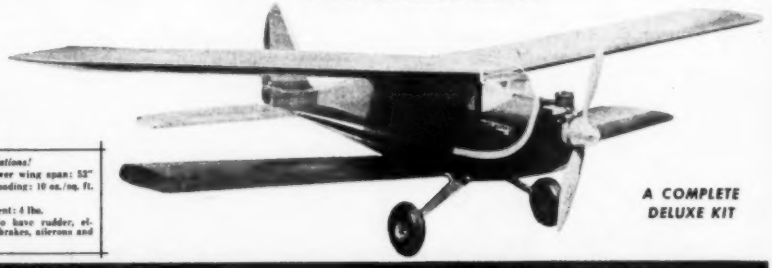

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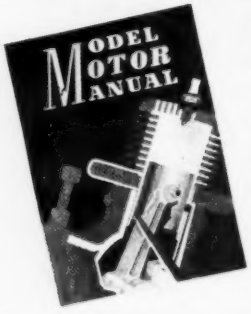

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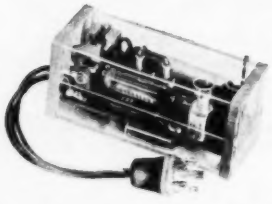

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The Tenderfoot

(*Continued from page* 20)

building. Now, cut the tapered trailing edge stock to length (three pieces for the wing and one for the stab). Next, cut the leading edges and the spars. Put the trailing edges in place on the plan, mark where the ribs are to join, and notch the trailing edge so that the end of the ribs will fit into the notches. The notched trailing edge is then pinned in place on the plan, as is the spar. Use one pin at each rib to make sure the piece is actually on the board. Next, cut out all ribs as shown on the plan (19 wing ribs and 8 stab ribs), fit them to the spar and trailing edge, and cement in. Again pin down each rib to make sure it is all the way down touching the board between the spar and trailing edge. On the wing, leave out, for the time being, the two ribs at the dihedral joints. These are to be put in only after the three sections are joined with dihedral. Also, the spars are not cemented together at this time. Finally, add the leading edges (these do not touch the board).

Wait at least one hour for the cement to dry, remove all pins, and lift the sections from the waxed paper. The three wings sections are then joined as follows: Take a scrap strip of balsa and push a pin through it just 3" from the end. This stick is then used to hold up the end of the wing by pushing the pin into the tip, while the main section remains on the board. (If available, a 30-60 degree triangle may be used to support the tip section instead of the balsa piece.) Fit the tip to the main section by trimming leading and trailing edges of both pieces until they fit together at the dihedral angle. Pin down the main section and finish off the joining job by running a piece of sandpaper through the joint while holding the tip in place. After making sure the rib will fit, cement the tip in place and add the rib. The second tip is joined as the first was. Again, let it dry one hour before taking up from the board. Finally, cut out and cement in place the six gussets, rough form, and add the tip blocks.

After all the pieces are cemented in place and the cement has dried, trim off the spar bottoms at the dihedral joints, and shape the leading edges as shown on the plans. Prepare the wing and stab for covering by sanding smooth all surfaces which will be in contact with the covering after it is put on.

Cover and water dope the wing and

stab, per the following "hints," except, dope the paper to the two center ribs on the stab top.

General Covering Hints: Use Skysail or Silkspan for ease of covering. Try Jap tissue later since it gives better appearance but it is more difficult to apply. Use dope which has been allowed to partially dry out and become very thick, to attach paper. Except when covering concave surfaces, attach paper only to outside edges. One good technique is to cut the paper oversize, tack at opposite points, pulling tight, then dope down the two flaps, pulling each corner in an outward diagonal direction. Dope may be put on frame or brushed directly through paper. Cover center panel first and work out in both directions. To avoid paper pulling up at dihedral joint on top as paper pulls taut, fold over and dope to dihedral rib. Cover entire top, trim with a new razor blade, dope down loose edges, folding halfway around leading and trailing edges, then cover bottom, repeating the trimming and loose edge doping. Spray water on completed wing (waterdope). As it dries, the covering will shrink and the wrinkles disappear. Dope (and fuel proof) according to usage and frame rigidity. Use less dope on a small, lightly built model than on a large, beefy job. If a glow engine is used, the completed model should be hot fuel proofed. Ask your hobby dealer to recommend a good fuel proofer.

Having your Tenderfoot wing and stab covered, cut out and sand the rudder and dorsal fin. Carefully cut out the narrow tissue strip between the two stab center ribs on the top only, and cement in the rudder and dorsal fin. When the cement dries, the wing and stab may be given three or four coats of dope. It is suggested the dope be thinned down about 25% before starting.

Lay the wing and stab aside now, and pull out that piece of ⅛ x 3". From it will come both fuselage sides and the wing platform. First, cut the sides a little longer than shown, then cut the 3" wide wood into two 1½" wide strips. Place one of these over the plan so that the top coincides with the plan, and mark front, bottom, stab cut-out, and rear, by pushing a pin through the plan on the lines and into the wood in several places. By later connecting these pin points with a pencil, a faithful reproduction is produced. Cut out this side, sand it smooth and use it for a pattern for making the second side. The pylon is made by cutting three pieces of the ¼" sheet a little oversize, cementing them together, edge to edge, and pinpointing through the plan as above. After cutting out, round edges and sand. (Note that pylon goes to bottom of fuselage for strength.)

Since the pylon position shown on the plan is only approximate and will vary from model to model, to get the CG (balance point) where it belongs, the following assembly procedure is suggested.

Pin the two sides together, rubber band the engine on the front and the tail on the rear of the fuselage sides, and find the CG by balancing the assembly on your finger. Mark this balance point, measure 2⅝" ahead of this point and mark to locate the point on the sides where the pylon front will join.

Pin one of the sides to the plan, cement the ⅛ x ¼ bottom in place on the side, add the pylon, then the ⅛ x ¼ top pieces. Finally, cement the second side in place, using plenty of pins to make sure the pieces all come together. After the cement is dry, the fuselage may be removed from the plans and the final details added.

Cut out two pieces of ⅛" sheet and

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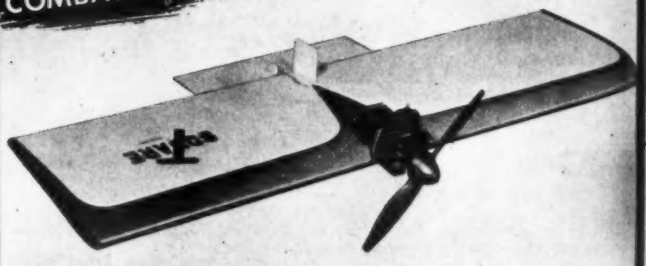

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cement together, edge to edge, as shown on the plans. After this is dry, sand it and add to the pylon top making sure it is square. Bend the wing hooks, cement in place, and cement a piece of gauze over each for added strength. Next, cut out the firewall, drill holes to suit engine, and cement to the fuselage front, being very careful to make the joint perfectly square, when viewed from the top. After this is dry, the balsa cheeks may be cut out, laminated, cut to shape and sanded to fair into the firewall. But before the cheeks are cemented in place, mount your engine securely, and cement the nuts to the back of the firewall. Cut out cheeks to fit engine nuts and bolts, and finally, cement cheeks on.

The tail assembly is now cemented on, after shaping the back of the fuselage to fit it. Cut down the right side (looking from the rear) more than the left, so that the right side of the stab will be ¾" to 1" lower than the left. This built in adjustment will help the model circle to the left in the glide. In cementing tail on, do it in such a way that the back of the rudder is very slightly off to the left. Check this by sighting with one eye through the rudder and into the pylon.

Before doping the fuselage and rudder, take the engine off and sand all surfaces smooth. If possible, use a timer tank with your engine to limit engine runs to about 10 seconds. If not, mount an eyedropper to the fuselage to use as a fuel tank.

After the fuselage is doped and the entire model hot-fuel-proofed, check the wing warps. If they are not correct, hold over a steaming tea-kettle and bend in the desired direction to change the warp. It is always necessary to over-warp in the opposite direction, as there will be some return. The finished wing should be flat or warped slightly for a left turn. That is, the left trailing edge warped up, the right trailing edge warped down, or both.

Finally, remount the engine, strap the wing on, and check the CG. If our figuring was correct when the pylon position was found, it will be very close to ½ of the wing chord (width) back from the leading edge. If not, add clay as necessary to balance. Before flying, put your name, address and phone number somewhere on the model just in case it should become lost.

Your Tenderfoot is now ready for test gliding. Choose a grassy field for this and later flying. Run with the model a few times to get an idea of the gliding speed, then launch it at this speed with the nose slightly down. If the model dives into the ground, put a piece of 1/16" balsa under the front of the wing. If it stalls, add the balsa at the rear. Continue this process until a smooth glide is obtained, then cement in the balsa shims.

Now for the first flight: After putting the prop on backwards (flat side toward the front), start the engine, get it running slowly, and launch the model against the wind in a slightly nose-up attitude. It should climb in gentle circles to the right and glide to the left. Correct any bad power tendency by cracking a rudder tab as shown on the plans in the direction of desired change. When convinced the rudder setting is correct, turn the prop around and turn her loose!

One final word: I sincerely hope the Tenderfoot gets you started in free-flight as this is a wonderful hobby and sport. Be patient, go slowly enough to think each problem out and you, too, will be a model builder. Good luck.

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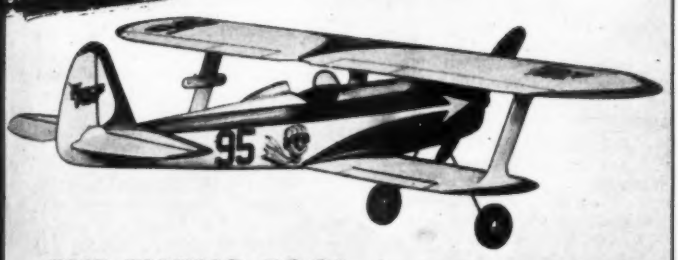

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The Golden Age of Air Racing

(*Continued from page* 11)

their maximum potentials. The second five races witnessed the emergence of brand new designs incorporating innovations and refinements representing the finest mechanical and aerodynamic practice in the world.

The 1930 Thompson, held in Chicago, was preceded by an almost feverish rush of building and testing practically up to the close of qualifying trials. Interest was high on part of both spectators and aircraftsmen. Favorite of the race was Ben Howard's diminutive "Pete", a slight, slim racer with only 90 hp turning its prop. The crowd loved this little wisp of an airplane literally flitting through the air in competition with such high powered brutes as the Laird "Solution" carrying a 470 P & W Wasp powerplant.

Only tried and true racing plane in the contest was the Travel Air Mystery "S" design, of which three examples started with the field. James Haizlip flew one sponsored by the Shell Oil Company to second place with a speed of 199 mph; Paul Adams flew an "S" to win fourth place at nearly 143 mph and Frank Hawks, flying his Texaco #13 was forced down and did not finish. In view of the Travel Air hands-down victory the year before, there was considerable surprise that the winner of the race was Charles "Speed" Holman at the stick of the only biplane ever to win a Thompson. His Laird LC-DW-300 #77 edged Haizlip out by only a slim margin at a speed of 201.91 mph. Ben Howard, flying his "Pete" #37 finished third at nearly 163 mph. A special Cessna racer, with Everett Williams at the controls, dropped out in eighth lap.

The only military plane entered in the 1930 Thompson was the often modeled Curtiss XF6C-6, a parasol monoplane that was virtually a Curtiss Hawk biplane minus the lower wing. Pilot Arthur Page was killed when the ship crashed during the race.

Thompson Trophy participation at Cleveland in 1931 was spurred by the prospect of substantial prize money—$15,000.—which sent designers and pilots to the drawing boards early. Two outstanding racing designs emerged, which, with modifications, were to remain prominent in air racing for several years. These were the Gee Bee 2 racing #4, flown to victory by Lowell Bayles at 236 mph and the Wedell Williams Special, racing #44, flown by Jimmy Wedell to second place at 228 mph. Bayles' Gee Bee was a Wasp powered design based on the speedy Gee Bee Sportster, while Wedell's ship was brand new from prop to tail, similar in low-wing, fixed-gear arrangement to the Travel Air "S", but unlike it in detail.

Third place in 1931 was won by Dale Jackson flying Holman's 1930 winner at 211 mph. Robert Hall, co-designer of the Gee Bee's placed fourth at 201 mph in a Gee Bee model "Y". Ira Eaker, later a general in W. W. II, placed fifth in a commercial Lockheed Altair low wing with a speed of 193 mph. Sixth and seventh positions were taken by Ben Howard with his "Pete" and William Ong in a J-6 Laird biplane.

The 1931 Thompson provided some thrills other than the running of the race itself. Dale Jackson, pushing hard for second place skidded low on one turn, brushed the tops of some trees. In recovering from a near crash, he lost considerable time get-

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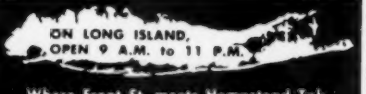

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ting back on course and lost position. Ira Eaker, the race completed, could not get his landing gear down on the final approach and belly landed. Jimmie Doolittle, of W. W. II fame, pushed his new Laird "Super Solution", racing #400, to a possible money winning spot, but was forced down in the 7th lap with engine trouble.

In 1932, the Thompson was again held at Cleveland. It brought out a mixture of brand new designs and some reworks of previous ships. The race was highlighted by a series of pre-race crackups and pilot changes at the last minute that made the outcome hard to predict.

Two famous Gee Bee designs, the R-2 racing #7 and the R-1, racing #11, powered by Wasp Jr. and Wasp Sr. engines, respectively, were almost identical in appearance. They were built for the Springfield Mass. Racing Association, headed by famous pilot Russell Boardman. He was slated to fly the higher powered Gee Bee, #11, but was injured in a crackup in another ship shortly before the National Air Races. Meanwhile, Jimmie Doolittle cracked up his redesigned Laird, with clipped wings and retracting landing gear, in a test flight. Doolittle was chosen to fly Gee Bee #11, which he pushed to first place at 252 mph. Most exciting aspect of the 1932 race was the fight for second place, staged by Jimmie Wedell in his #44, taking the spot at 242 mph, and Roscoe Turner in Wedell Williams racing #121 who finished third at 233 mph. Jimmie Haizlip, in Wedell Williams #92, finished fourth at 231 mph. Gee Bee #7 came in fifth at 222 mph under the skilled handling of Lee Gelbach.

One of the most unusual new designs of the 1932 Thompson was the "Bulldog" racer, "dream ship" which Robert Hall of Gee Bee design fame flew to sixth place with a speed of 215 mph. This high-wing "gull" monoplane powered by a Wasp Jr., engine did not live up to its expectations. It has been a popular design with model builders over the years. William Ong, flying a new Howard racer, the DGA5 "Ike" came in seventh at a relatively slow 191 mph. Ray Moore, piloting a Rider R-2, qualified in contention but dropped out in the second lap with engine trouble.

Except for the Rider R-2, all the contestants were aboard wire or strut braced monoplanes. The Rider was the only cantilever wing, retractable landing gear plane among the starters. While notable for new designs, winner of the race was pretty well determined during qualifying trials. During the Shell Dash, qualifying event for the Thompson, Doolittle set a new world's landplane speed record of 296 mph with Gee Bee #11.

The 1933 Thompson, held during the National Air Races in Los Angeles, was somewhat of a disappointment. Pre-race activities claimed the life of Russell Boardman, who was killed in Gee Bee #11 when it crashed taking off from a re-fueling stop at Indianapolis in the Bendix Race. Gee Bee #7 also cracked up and was out of the running. This left the field free for two of the oldest—but among the fastest—planes of the day, the Wedell Williams #44 and #92.

What was tragedy for one was triumph for another. Jimmie Wedell, whose planes had been making air race history, but with someone else at the controls, finally won the Thompson of 1933 in his #44, with a speed of nearly 238 mph. Lee Gelbach, flying Wedell Williams #92 took second at 225 mph and Roy Minor, flying Ben Howard's "Ike" captured third place at nearly 200 mph. George Hague, flying the Rider R-2, racing number 1, which was piloted by Ray Moore in the 1932 Thompson, finished fourth with a speed of 183 mph. Coming in fifth was Z. D. Granville, one of the co-originators of the Gee Bee line in a Gee Bee "Y" Senior Sportster at a speed of 173 mph.

Roscoe Turner, flying a Wedell Williams that was to figure prominently in subsequent races, and one of the favored contenders, fell victom to the pylon rule. If a pilot cut inside a pylon, he was required to recircle the missed pylon on the same lap. Turner apparently did not realize he had cut the pylon so closely, but the judges ruled he did cut inside. Since he did not recircle in the same lap, he was disqualified. Although he finished the race his fine performance was ruled out.

Jimmie Wedell's well deserved victory in the 1933 Thompson was short lived. As nice a fellow as ever jockeyed a throttle, Wedell was killed in June, 1934, in a crash that occurred while he was teaching a student to fly. He had pinned his hopes of another Thompson victory on a completely new ship, a low-wing cantilever job with retracting gear. Enthusiasm of the Wedell-Williams organization died with Jimmie—his new ship never did become a Thompson contender, hard luck dogging it all the way.

Wedell Williams aircraft, however, remained important factors in the Thompson. In the 1934 race at Cleveland, Roscoe Turner, flying his Wedell Williams #57, won hands-down at a speed of 248 mph. Turner's ship was his 1932 #121 with some structural and aerodynamic modifications and a P & W Hornet engine instead of the original Wasp Jr. Turner's strongest opponent during the first half of the race was Doug Davis in Jimmie Wedell's #44. It was pretty much of a toss up whether Davis or Turner would win until the 8th lap, when Davis crashed.

From there on, it was Turner's race. His next closest competitor was Roy Minor, who came in second with a speed of 214 mph. Minor flew one of the new ships that year, Larry Brown's "Miss Los Angeles", a Brown B-2. Although powered by only 300 horses, delivered by a Menasco C6s engine, it had a winning speed potential as demonstrated two years later. But in 1934 it was a new ship, with considerable experience to be gained in its maintenance and handling.

Third place went to J. A. Worthen, who piloted Wedell-Williams #92, Gelbach's 1933 second place winner, at a speed of 208 mph. Ben Howard's perennial "Ike" placed fourth at a mile-an-hour slower, piloted by Harold Neumann. Keth Rider's R-1, racing number 131, with Roger Don Rae at the stick, nosed in fifth at 205 mph. Art Chester, flying his famed "Jeep", came in sixth at 191 mph. Besides the non-finisher Davis, Lee Miles in his Miles and Atwood Special came down in the 12th lap.

An important change took place in the course laid out for the 1934 Thompson. Higher horsepowers, heavier ships and wider turning radii, as the result of higher speeds, brought a change in the Thompson course to 20 laps of 8⅛ miles each. Controllable pitch props also were coming into general use. They enabled the planes to get off faster and accelerate out of turns more easily.

The purpose of the Charles E. Thompson race was coming into being—development of high speed aircraft. Designers were beginning to use genius rather than ingenuity; the job of piloting was becoming more difficult. The results of this trend in American closed course, free for all racing, will be continued in the second part of the "Golden Age of Air Racing."

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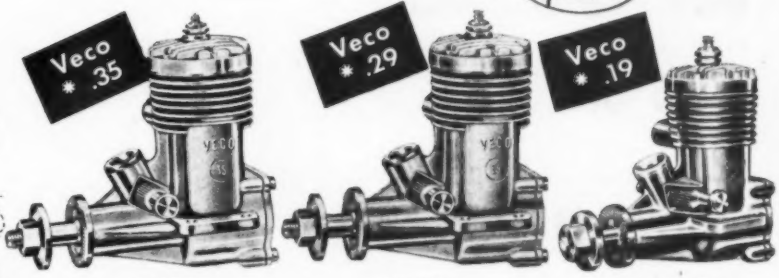

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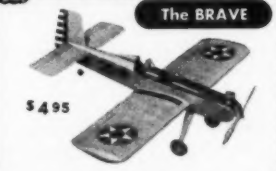

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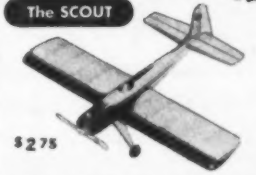

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Let's Get Started

(*Continued from page* 19)

dividing engines into various classes for competition flying. Abbreviation: Cu. In. Disp.

DECALAGE—Angular difference between wing and stab incidence. Simple isn't it?

D.T.—Dethermalizer. A timer-actuated device (such as "pop-up" stabilizer) to spoil flying trim of free-flight model so that it will descend rapidly to prevent loss due to rising air currents.

D.-DIA.—Diameter.

DIHEDRAL—Upward slant of wing panels outward from center. A little bit helps keep model right side up.

DOPE—First cousin to cement. Clear or colored, used to tighten and strengthen covering. Very difficult to remove from furniture and clothing. Only known way to remove from fingers is by chewing. (That's a joke, son!)

DOUBLE-SURFACED WING—A wing of some thickness with covering on top and bottom.

DOWEL—A round hardwood strip. Used for wing hold-down pegs.

DOWNTHRUST—Tilting engine slightly downward to reduce steep climbing or looping tendencies. Nearly every free-flight and radio model needs more than you think!

DRAG—Resistance to flight caused by shape of airplane. Has nothing to do with hot-rod racing.

DURAL—Contraction for duraluminum, an aluminum alloy.

ELEVATOR—Movable part of horizontal tail. That flap in the back. "Flipper."

ELEVON—Combined elevator and aileron. Used on flying wing and delta wing types.

EMPENNAGE—Name given to whole tail group, including vertical and horizontal surfaces.

ENGINE—What most call a motor. Gas model power plants are engines not motors.

FAIRING—Any small area or part of airplane with separate smooth covering.

FALSE RIB—A short wing rib at leading edge located between full-length ribs.

FILLER—Heavy bodied liquid or paste used to seal and fill wood grain or covering before doping.

FILLET—A streamlined area built up at surface junctions such as: wing to fuselage or vertical to horizontal tails.

FIN—Stationary part of vertical tail.

FIREWALL—A plywood bulkhead located behind engine. Engines are radially mounted directly to firewall on some models. Term is a carry over from big airplanes where firewall is always made of metal for fire prevention purposes.

FLOAT—Pontoon. Seaplanes need them!

FLOOD—Why engines sometimes won't start. Excess choke or over prime puts too much fuel in engine; fuel-air mixture is unbalanced preventing firing.

FORMER—Bulkhead.

FREEWHEELER—A propeller having a device that permits it to revolve after rubber motor has unwound. The prop is said to windmill and has less drag than if it were stationary.

FUSELAGE—The body of the airplane.

GEODETIC—A type of model construction utilizing criss-crossed diagonal members. Noted for its rigidity and warp resistance.

GLOW PLUG—The gadget that provides heat to ignite fuel-air mixture in a model engine. Consists of high resistance wire that glows when current from booster battery is applied. After engine is run-

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ning, heat from combustion keeps glow plug hot.

GUSSETS—A triangular piece of sheet or strip placed at joints of a structure to give strength and stiffness.

HAND-LAUNCH—Starting flight of a model by throwing it or releasing it from the hand.

HOLD-DOWN—An anchor point for attaching rubber bands that hold wings, tails or hatches in place. Usually made of dowel or wire.

HORIZONTAL TAIL—Surface consisting of stabilizer and elevators.

HORN—Short lever arm attached to elevator or other movable surface. Part of control system on control-line models.

HYDRO—A model equipped to fly from and land on water.

INC.—Incidence, angle of incidence. Angular setting of wing or tail relative to the thrust line.

INDUCED DRAG—Resistance to forward movement of the wing caused by disturbance of surrounding air.

JIG—A fixture or form used for holding model parts during assembly.

KEEL—Main bottom member of fuselage.

KEY—Narrow strip of peg used to insure alignment of removable parts of model.

L.G.—Landing gear.

LEAN—Most suitable fuel-air mixture for peak engine RPM. Controlled by throttle or needle valve setting. Turning needle valve into body leans mixture. Backing needle valve out richens mixture.

LIFT—Upward force generated by wing passage through the air. Models can't fly without it.

LIFTING TAIL—Horizontal tail surface having wing-like airfoil or rib section. Used mainly on free-flight models and gliders.

LONGERON—Main nose to tail members of a fuselage.

LUBE—Rubber lube, lubricant. A mixture worked into rubber motor strands to increase their turn capacity. Typical formula: 4 parts liquid soap, 1 part glycerine, 8 parts water, boiled to syrupy consistency.

MICROFILM—Very thin transparent covering for indoor models.

MOMENT ARM—Distance from CG at which force is applied. The distance of tail surfaces and propeller from CG Free-flight models have long tail-moment arms for better stability. Control-line stunt models have short tail-moment arms to aid tight turning ability.

MONOCOQUE—Type of construction having skin act as main structural member with relatively light internal structure. Wings and fuselages completely covered with sheet balsa are a form of monocoque construction.

MOTOR—See engine. Rubber strands are used as a motor.

MOTOR BEARERS—Engine bearers. See bearers.

MOTOR STICK—A heavy strip used to support a rubber motor. The body of a stick model.

MUSIC WIRE—Hard, springy steel wire used in model construction. Very little of it around these days.

NOSE—The very front of the fuselage.

NOSE PLUG—A shaped wood block used to mount propeller shaft on rubber-powered models.

NON-LIFTING TAIL—Horizontal tail surface having symmetrical airfoil or rib section. Used mainly on C/L and R/C models.

O.O.S.—Out-of-sight flight of free-flight model or glider.

OFFSET—Offset thrust, offset rudder. An-

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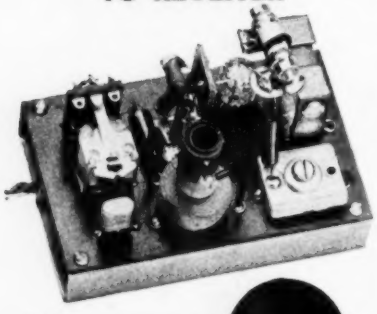

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gling engine or rudder from straight ahead position.

PARASOL—Airplane with wing mounted on struts above fuselage.

PITCH—Distance forward traveled by a propeller in one revolution. Also angular setting of a propeller blade. Used to identify different kinds of props. High pitch used for speed on control-line models. Low pitch used on free flight and R/C models.

PLANKING—Side by side strip or sheet balsa covering.

PLYWOOD—Strong sheet wood made by gluing together thin layers of wood with grain running at right angles. Abbreviation Plyw'd. Ply.

POLYHEDRAL—Multiple dihedral. Usually four wing panels are slanted upward at different angles. Used to gain stability.

PONTOON—Float.

POS.—Position. Also positive.

PRIME—Injection of few drops of fuel into engine cylinder or intake to aid in starting.

PROPELLER—The "fan" that makes the model go. Abbreviation: prop.

PROP HANGER—Metal fitting used to mount prop shaft on a motor stick.

PULSE JET—Dyna-jet. Very noisy.

PUSHER—An airplane having engine mounted ahead of propeller.

PUSHROD—Part of control system that transfers movement from bellcrank to elevator horn in C/L models. Usually made of wire. Also used for similar purpose in R/C models.

PYLON—Built-up or solid fin-like wing mounting. Commonly used on free-flight models.

RADIAL MOUNT—Disc like rear of engine crankcase with holes for attaching engine to firewall or bulkhead with screws or bolts.

REQ'D.—Required.

RIB—See airfoil.

RICH—Fuel-air mixture having too much fuel, resulting in slow engine running. See lean.

RISER—Upward moving current of warm air. A thermal.

R.O.G.—Rise-off-ground. R.O.W.—rise-off-water.

ROCKET—Jetex.

RUDDER—Movable part of vertical tail.

S-HOOK—Wire fitting bent to shape of letter S. Used with rubber motors.

SIDE THRUST—Angling engine away from straight ahead for purposes of flying trim adjustments.

SIDEWINDER—Engine mounting with cylinder horizontal.

SINGLE SURFACE WING—A wing with very thin airfoil or rib. Open structure wings of this type are covered on top side only. Usually sheet balsa used for this type of wing.

SPAR—Main span-wise members in wing or tails.

SPIRAL STABILITY—The ability of a model to perform fast turns without diving into the ground. Free-flight modelers wish they could buy this item in the hobby stores.

SPONSON—Short, wing-shaped structures on sides of flying boat hulls that help prevent model from turning over on the water.

SQ.—Square.

STAB—Stabilizer. Fixed portion of horizontal tail.

STABILITY—The tendency of an airplane to fly level or return to level flight from turning flight or other unusual attitude.

STALL—Loss of lift resulting from too steep climb.

STREAMLINE—Forming of all airplane parts to reduce drag.

STRINGER—Wood strips running nose to tail on fuselage, used to give covering smooth contours. Generally smaller in size than longerons.

STRUTS—Brace members of streamline cross-section. Used to support wings and tails or parts of landing gear.

SWEEPBACK—Angling back of wing from center outward as viewed from top. Used to increase stability.

SYMMETRICAL—Equal on both sides of a centerline. Describes model airfoils that have same contours on both sides. Stunt model wings have symmetrical airfoils or ribs. Non-lifting tails and vertical tails also have symmetrical rib sections.

TAB—A small adjustable flap on flying surfaces used for flight trim adjustments.

TAIL, VERTICAL—Fin and rudder.

TAIL, HORIZONTAL—Stabilizer and elevators.

TAIL SKID—Projection of wire or wood under rear of fuselage used to support model.

T.E.—Trailing edge.

TEMPLATE—A pattern for outlining parts to be cut from sheet wood or sheet metal.

THERMAL—See riser.

THINNER—A strong smelling liquid used to thin dope or cement. Also used for cleaning dope brushes and removing dope spots from floor and clothing.

THK.—Thick.

THRUST—Propulsive force generated by whirling propeller and jet or rocket blast.

THRUST LINE—An imaginary line drawn rearward from center of propeller, jet or rocket engine. The line along which thrust acts.

TIP—Outer end of flying surfaces.

TIMER—Automatic device used to stop fuel flow or perform other operation at end of given period of time. Also name of official of model contests who time flight of contestants' models. Can be recognized by sun helmet, sunburn, dark glasses, stop watch around neck and harried expression.

TORQUE—Force acting on a model that tends to revolve it in opposite direction to direction of propeller rotation. A constant menace to free-flight modelers.

TOW-LINE—Launching cord or string used for starting flight of tow-line gliders. Close relative of kite string.

TRICYCLE GEAR—Three-wheel landing gear, having a single nose wheel and two main wheels.

TRIM—The adjustment of tabs, flying surfaces and offset thrust to achieve stable and high performance flight. A difficult art to learn and master.

TISSUE—Thin light-weight covering material.

U-CONTROL—System of control-line flying originated by Jim Walker. Forms the basis for most of C/L flying today.

UNDERCAMBER—Convex curve of bottom surface of some airfoils.

VERTICAL TAIL—Fin and rudder.

WASHIN—Twist of wing or wing tip to lower the trailing edge.

WASHOUT—Twist of wing to raise the trailing edge. Serves to cause center section of wing to stall before tips. This aids smooth stall recovery.

WING—The main lifting or flying surface of an airplane.

WING SECTION—Airfoil, rib, rib section.

WING SPAN—Distance from tip to tip.

WING TIP— There are many tattered ones.

YO-YO—Control-line model. Not a toy.

ZOOM—Sudden steep climb. Every model should have one.

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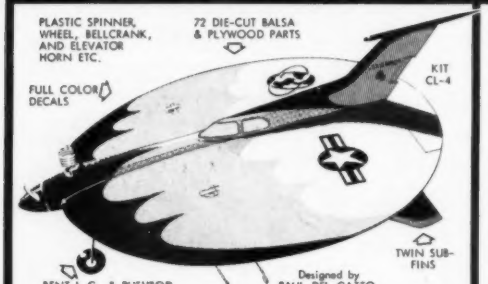
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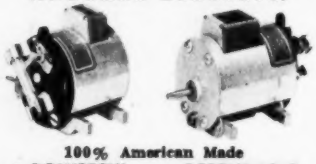

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Big D

(*Continued from page* 28)

slot, remove the spar and cut the slot —then cement the spar in place. This assures absolute accuracy in the alignment.

Pin the ¼ sq. leading edge and ¼ x 1 trailing edge center section pieces on the plan; also the ⅛ sq. bottom center section spars. Cement ribs W.l. in place but do not put in the top center section spars until the dihedral is built into the wing. Cement the ¼ sq. main wing leading edge pieces with a butt joint to the leading edge of the center section, and pin flat on the plan. Cement with a butt joint the ¼ x 1 trailing edge piece and pin flat on the plan. Note that the under surface of this part is beveled up. The remainder of the trailing edge, ½ x ¼, is now located. These pieces are cemented with a butt joint to the first part of the trailing edge, and then raised ⅜ in. at the tip and held in place with a small piece of balsa under the tip during construction. Small wedges of balsa placed underneath at about 2" intervals will hold these pieces rigid while the ribs are installed. This is done to build in the necessary washout for this type of wing.

All ribs are now installed. Note that the leading edge of each rib must be beveled to fit. The lower ⅛ sq. spars are not put in until the wing is lifted from the plan. When all ribs are set, install all upper ⅛ sq. spars except for those across the center section. The sheeting on the lower part of the center section is cemented in. This goes between the ribs, as indicated on the sketch on the plan. While the wing on the plan, the leading edge sheeting and cap strips are cemented on. Do not cover across the center section yet. When dry, take out pins holding the contruction to the building board, except those at the center section. Raise the wing tips 1" and place a piece of balsa under the leading edge of the tip to hold the tip at this height. This gives the required dihedral.

Now, the center section top is completed. Cement in the ⅛ sq. spars. install, and cement in place the ⅛ plywood engine-mounting supports (or inserts). Cement on the 1/16" sheet upper surface. Cement on gauze strips over all places where there has been a butt-joint —these locations are shown on the plan. When dry, remove the wing from the plan and cement in the lower ⅛ sq. spars. These spars are not really spars but a stiffener to hold the ribs in position, and to prevent shock-tearing of the covering.

Lightly sand the wing. It is covered with nylon, silk or heavy-weight Silkspan. Cover the wing with your choice of covering material but, before the first coat of dope, cover the elevons with light-weight paper and install on the wing. Bend the elevons to the full "up" position and then give the wing the first coat of dope. The elevons in the "up" position prevent a warp from developing on the trailing edge of the wing. When the first coat of dope is dry, the "droop snoot" pieces are cemented to the under side of the leading edge of the wing. Cover these with light-weight paper and give one coat of dope. Apply the remaining coats of dope. If a glow plug engine is used, use fuel proof dope.

Color the wing to suit your taste, cement on the elevon adjusting blocks and the tip fins. Put the wing aside. The aerodynamic value of the tip fins is open to debate. The model will fly just as well without, but they protect the elevons.

FUSELAGE: The outline is made up of 3/16" x 1" balsa. Pin down on plan, cement in spacers. Bend at front is accomplished by cutting slots in the balsa and steaming lightly. Cover one side of the fuselage with 1/16" sheet with the grain running diagonally. Remove from plan when dry and cover other side with grain running in opposite direction. Cement on the ¼" soft balsa sheet sides at forward end and, when dry, carve and sand to shape. Cement in the 1/16" ply wing rest pieces—note these are countersunk into body. Cement on and carve to shape the nose block. If you are going to use an undercarriage, cement in ⅜" ply insert for attaching main gear. Cement on 1/16" ply front wing brace. This keeps the wing from moving forward. Reinforce this area with gauze so ply brace cannot be pushed forward in a nose-low landing. Cover fuselage with light-weight paper, dope, color to suit. Two ballast boxes are shown, one in nose, one in tail. If a very light .049 engine is used then a nose weight will be needed. If a heavy .15 engine is used, it may be necessary to use a bit of weight in the tail to get the CG in the correct location.

FIN: It is a flat plate section with a streamlined portion on its lower part. Make up the flat portion of the fin on the plan and while the cement is drying, cement on the lower half rib, and cover with 1/32" sheet. Remove from plan, add half rib to other side, and cover with 1/32" sheet. Sand lightly, cover with Silkspan. Dope and color to suit. Install trim tab (after it has been covered and doped) and cement fin in position on rear of fuselage. Make sure that the fin is aligned correctly fore and aft.

TAILPLANE: Is made out of 3/16" medium balsa sheet. Cement parts together, sand to airfoil shape, cover with light-weight paper, dope and color.

ENGINE NACELLE: Cement base pieces (1/16" ply & 3/32" sheet) together using a contact cement such as Pliobond. The curve is obtained by holding the pieces over the center section leading edge while joining. Cement and tack the 5/16" sq. engine bearers to the ⅜" ply core piece. Insert the core in the slots in the base piece and thoroughly cement. The remainder of the nacelle is built up, using ⅜" medium balsa for the sides of the pylon and soft balsa for the top part of the nacelle. Shape and sand all over and give several coats of dope. Tank and timer installation positions are shown on the plan. For a radial mount engine use a ⅜" ply face at the rear of the engine and build up the nacelle in the same way.

ASSEMBLY: Locate wing on fuselage. It

will center itself at the front end because the "droop snoot" sections fit down over the sides of the 1/16" ply front wing rest. Secure trailing edge with elastic bands. Place engine nacelle in position, line it up fore and aft, and screw down at the rear end. Secure front end of wing and nacelle with elastic bands. Tailplane is held with elastic bands over top of fin.

FLYING: Using a Cub .15, weight should be around 18 ounces. One has leeway as the model will carry quite a weight. However, if contest performance is desired, it is best to keep the weight down initially and then use ballast to bring it up to the required weight for the rules under which you fly.

Be sure the model balances where indicated. A bit of leeway is permissible here and slight nose heaviness is preferable to any tail heaviness. A tail-heavy free-flight delta will show the stunt lads some tricks they can't do on the end of wires.

Elevons serve a dual purpose. They act as elevators and ailerons. They will make the model climb or descend and also make it turn. If one elevon is higher than the other, then the model will turn in the direction of the higher elevon.

Keeping the above in mind, let's start the glide testing. Screw the elevons in a slightly "up" position. (See sketch of wing tip detail on plan.) Pick a reasonably calm day and a field with long grass or soft ground. Make sure that the fin trim tab is neutral. Hold the model at arm's length over head and run along into the wind and, by means of an overhand throw, send the model into a glide in a very slightly nose-down attitude. It will take a bit of practice to determine the correct gliding speed of a delta. Too hard a throw will make the model nose up and too slow a throw will cause it to mush. If the glide is too steep, screw up the elevons a shade at a time. If the model wants to stall, unscrew the vernier screws and the elevons will depress themselves through the action of the elastic bands on the adjusting blocks.

Continue glide testing until you have obtained a flat fast glide in a straight line. When you are satisfied that the glide is correct, raise the left elevon just a shade and lower the right elevon the same amount. Glide the model and watch for a slight turn to the left. Continue this until a medium turn to the left is obtained. Now start playing with the trim tab on the fin. Give it about ¼" turn to the right and glide test again. This will make the model glide straight again or show slight turn to the right. The idea is to get a slow turn to the right by means of the tab which is counteracting the elevons which you have already adjusted to give a turn to the left. Confusing isn't it? The reason is that under high speed with power the elevons will hold the left wing down and cause a left turn but the trim tab is trying to turn the model to the right with the result that the nose is held up in a left turn under power and the model will not develop a spiral dive.

For first power flights it is best to hand launch the model—if you have installed an undercarriage. Run the engine rich and hand launch the model with a fair heave in a slightly nose-up attitude. This must be done because the model has a high thrust line and the model must get away at near flying speed or it will be taken over by the thrust of the engine and head for the ground. Watch the low-speed power flights to determine if any adjustments are necessary, then increase the power until you have it wide open. Once you get used to your model you will, no doubt, play around to find the flight path you like best. Once the model is trimmed,

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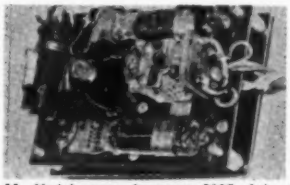

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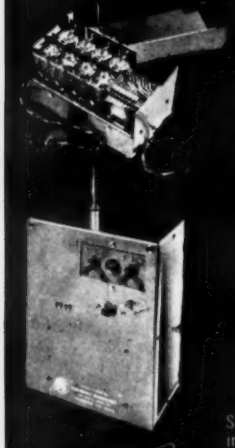

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ROG is just a matter of putting the model on the ground, starting her up and letting her go. It will not ground loop but because of its high thrust line it will take rather a long run before it suddenly lifts off and goes into a howling climb.

For the benefit of those who are used to the conventional model with its large tailplane, the tailplane on this model will appear to be small. The tailplane on this model is a true stabilizer and its only function is to stabilize the reaction of the wing which already has its stabilizer built in in the form of washout and elevons. A word of caution—do not decrease the minus 2½ degrees incidence on the tailplane as this will upset the stall recovery of the model.

BILL OF MATERIALS

12 ¼ x ⅜ x 36—Wing spars.
2 ¼ x ¼ x 36—Wing leading edge.
3 3/16 x 1 x 36—Fuselage outline or cut these from 3" stock.
1 1/32 x 3 x 36—Fin covering.
5 1/16 x 3 x 36—L. E. sheeting, capstrips, fuselage sheeting and center section sheeting.
4 3/32 x 3 x 36—Wing ribs.
2 ¼ x 3 x 36—Wing ribs, nacelle.
4 3/16 x 3 x 36—Elevons, fin outline, tailplane and 'droop snoot' pieces.
2 ¼ x 3 x 36—Fuselage sides.
1 ⅜ x 3 x 18—nacelle.
1 3/16 x 3/16 x 8 hardwood—engine bearers.
Piece 4 x 6 1/16 ply
Piece 4 x 6 ⅛ ply
18" of 3/32 piano wire.
3 sheets heavy weight Silkspan or equal area of silk or nylon.
3 sheets light weight Silkspan.
4 large tubes cement.
1½ pints clear dope.
Color dope as required.
One 1" wheel and two 2½" wheels.
Fuel tank, timer, engine, prop 7½ x 3, fuel and a nice place to fly.

How to Adjust Hot Free Flight

(*Continued from page* 18)

the model balances when supported close to the wing root.

The amount of decalage necessary and the CG placement are dependent on the design of the aircraft. Generally, models with non-lifting stabilizers balance from 25% to 40% of the wing chord aft of the wing leading edge. With lifting stabilizers the CG usually lies 50% to 85% aft, although with large stabs and long moment arms the CG may extend aft of the trailing edge of the wing.

The amount of decalage necessary varies widely with the type of model and may be from zero to 5 degrees or more. Generally, with lifting stabilizers, the greater the thickness of the stabilizer airfoil in relation to the wing airfoil, the more decalage is required.

The important thing to remember about decalage and CG placement is that if one is wrong you cannot correct the difficulty by changing the other. The most common mistake is to try to correct a stalling glide caused by the CG too far aft by decreasing decalage.

The proper technique is to follow the plans of the model as to CG placement and decalage to start with. Then hand glide to determine if the glide is reasonably flat with no stalling characteristics. When adjusting the contest free-flight, don't worry about final glide trim until the desired power pattern is achieved. Adjust climb by shimming at the leading or trailing edge of the stab. As long as the model pulls out of the stall quickly when the engine cuts, decalage may be decreased by shimming up

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the front of the stabilizer as necessary to eliminate looping tendencies. If, however, the model's recovery is slow from a stall, do not attempt to eliminate looping tendencies by further reducing decalage. Once the power pattern is set, the CG position should be varied to produce the lowest sinking speed. If the model stalls or mushes, add weight to the nose; if the glide is too fast add weight to the rear of the fuselage. It has been assumed in the foregoing that the glide trim was not too far off because wide changes in CG placement also affect climb trim and recovery.

Used properly, a rudder tab is virtually indispensible to proper adjustment of the flying model. However, particularly on the hot free-flight it must be used with care and discretion. Rudder tabs should be small and stiff enough so they are not easily bumped from their settings. On a class "C" free-flight a tab ¼" by 1¼" is amply large and should be moved only a fraction of an inch at a time.

The main point to remember about rudder tab adjustments is that their effect increases proportionably with flight speed. This is just the opposite of thrust adjustments, and consequently, it is by the use of tab and thrust off sets that the flight pattern of a model may be balanced between low and high speed trim.

Tab offsets also produce leverage effects tending to roll the molel as well as turn it. This effect is very noticeable on some designs. As an example, the Spacer uses an underslung fin which causes it to have a strong right turn tendency. This is counteracted by offsetting the rudder tab to the left. Since the tab is below the longitudinal axis of the model, it exerts a leverage tending to roll the aircraft to the left. As the model climbs to the right under power, this left tab leverage tends to keep the model climbing without dropping the inside or right wing panel and, consequently, helps produce a very desirable climb pattern

To sum up the use of rudder tab, its effectiveness increases radically with flight speed. Fast models are very sensitive to the slightest tab movement. Use the rudder tab for minor directional trim or as necessary in combination with other adjustments.

The easiest method of achieving proper glide turn is by tilting the stab as stabilizer tilt has little directional effect on power flight. This adjustment is effective on models with lifting stabilizers and rearward CG position. The model will turn in the glide towards the high stabilizer tip. Most models tend to turn naturally in the glide so use stabilizer tilt to tighten the model's natural glide turn to the desired amount.

The preceding has described the adjustments most commonly used to obtain the desired flight pattern. To illustrate possible adjustment combinations we will flight test several hypothetical models. However. before test flying, all models should be carefully checked and prepared.

Wing and stabilizer surfaces have several weeks curing time during which warps are removed by heating the surfaces and twisting opposite, to the warp, If possible, let the surfaces sit in the hot sun for several days and periodically check to see that warps removed do not come back.

It is difficult and sometimes impractical to remove all warps. Some warping can be tolerated so long at its effect is neutralized by other warps. As an example, wash-out of one stabilizer is all right if the other panel is washed-out in a similar manner. The main consideration is that any warps that do occur don't work against the model's desired flight pattern. Watch out particularly for wash-out of the wing and stabilizer panels inside the model's power circle

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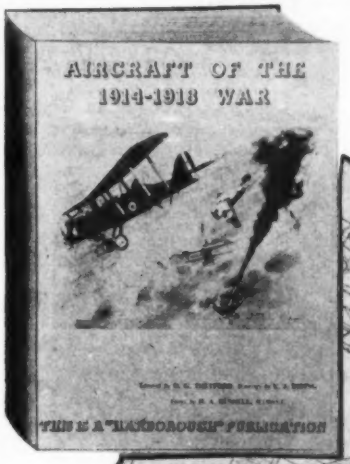

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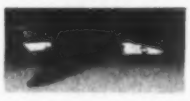

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or wash-in of the outside surfaces. Slight wash-in of the wing panel inside the power circle is usually desirable and many designs specify it. Don't attempt to fly a model if the preceding conditions can't be met. If necessary build new surfaces.

The wing and stabilizer should be carefully aligned perpendicular to the fuselage and keyed in place to prevent accidental shifting. Wing and stabilizer keys should allow absolutely no shifting of the surfaces. The fin should be aligned parallel to the fuselage or offset as specified. The angular difference between the wing and stabilizer (decalage) should be carefully checked as previously described. It's safest to start with a slight excess of decalage and shim it out as test flights indicate. If the design does not specify the exact amount of decalage; 1/32" to 3/64" per inch of wing chord is usually ample.

Balance the model by suspending it by the finger tips as close as possible to the wing root. If it doesn't balance as shown on the plans, add weight to the nose or tail until it does. Under no circumstances should an attempt be made to fly an improperly balanced model, no matter how much weight must be added to achieve proper balance. A good way to add weight to the nose is to melt lead into the engine's crankcase cover. If the model can't be balanced without adding a large amount of weight, lengthen the nose or build a lighter stab (consistent with adequate rigidity). Excessively long nose moments make adjusting difficult so keep the stabilizer light. If it is necessary to add weight to the rear, cut a hole through the stabilizer platform and fill with clay as required. To complete the preflight check, measure carefully to see that the engine has the prescribed offsets.

In all the preceding, no sloppiness or half-way measures can be tolerated. At best, the hot contest free-flight is a very delicate balance of many opposing forces and it takes very little to upset the balance.

The model's surfaces should be securely strapped in place with rubber bands. It might be well to mention that when in doubt as to how many bands are required to hold a surface in place, always put more than would seem necessary. Don't worry about the effects of tightly strapped surfaces in case of a crack-up. Actually, the advantages of "pop-off" surfaces are highly over-rated anyway.

Hand gliding is the first step in test flying. This should be done in absolutely calm weather, as it is virtually impossible to tell anything in the wind. Hand gliding will show up serious errors in trim but don't waste time trying to obtain the flattest possible hand glide as it doesn't mean much and many have to be changed as a result of power tests anyway. Just check to see that the glide is reasonably flat with no pronounced turning tendency.

Essential to successful test flying is an engine that will run smoothly and consistently at low speed. Use a low-nitro fuel and sometimes a hotter plug than for full-power operation. Plugging the engine's venturi with scrap balsa is necessary on some engines while others run well at low speed without restriction.

Don't attempt to fly unless the engine is running properly. If it quits soon after launching, you will have at best to change a prop. If it leans in to full power, you may be in for more serious trouble. Some builders put the prop on backwards and this is a good safety precaution so long as you remember to reduce power considerably when the prop is put on forwards. There is a big difference in thrust and sometimes

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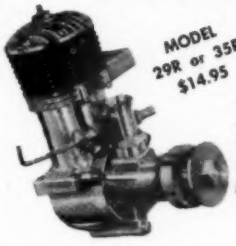

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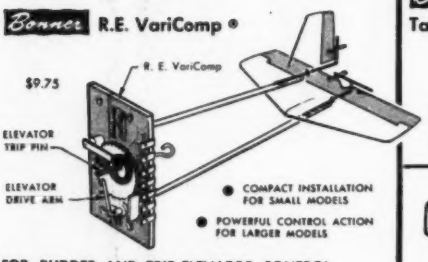

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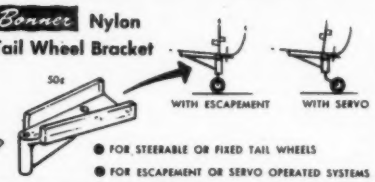

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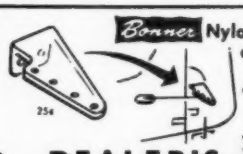

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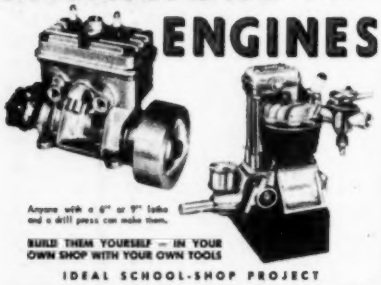

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flight characteristics between prop on backwards and then forwards.

Test flights should be made with an engine run of about seven seconds. Shorter runs don't prove much and may not get the model high enough to recover from the stall when the engine cuts. Longer runs give the model too much time to get into trouble.

From this point on no definite testing procedure can be described as this will depend on the individual model. However, we can describe certain hypothetical flight problems and their possible cure.

After launching, the model climbs steeply in a right spiral. Increased power results in a steeper climb and as the model starts into a right turn it dives sharply to the right then regains speed and up again into another diving half loop. The problem seems to be that as soon as the model starts to turn, it drops the right wing and dives until speed is built up again to repeat the climb and dive. Usually a sure cure for this is to wash-in the wing panel inside the power turn (in this case the right panel). Now the model climbs steeply and as it starts to turn, the wing wash-in lifts the right wing and it circles up smoothly. However, the circle required to keep the model from looping is rather tight. Stall recovery seems very fast so before increasing power we'll shim out some decalage by inserting a 1/32" sheet wedge underneath the front of the stab. Another flight and the pattern looks fine so we'll increase engine power again. Look out! The model has whipped into a sharp right banking turn and after picking up speed climbed straight up and started to turn to the left. Another few seconds engine run and it might have dived into the left. Time to sit down, calm our nerves and think the problem out. Obviously the increased power has induced a bad right turn until it picks up speed and then the darn thing wants to dive in to the left. The wing wash-in has corrected one problem at lower power but is partially responsible for this new problem at higher power. We need to provide the proper transition between high and low speed trim. Since thrust is effective at low speed, we shim a few degrees left thrust into the engine to eliminate the sharp initial right banking turn. Because rudder tab becomes increasingly effective with flight speed, we bend the rudder tab slightly to the right to correct the high speed left turn tendency. A bit of juggling of left thrust and right tab and now she climbs smoothly in a right spiral. However, the model still is wasting too much time in too tight a spiral. Since recovery is still fast we can shim up the front of the stab. Another 1/32" to widen out the power pattern. Now full power and up she goes like a rocket. A little too much right spiral for optimum climb so we bend the tab very slightly to the left. Now that everything is in the groove the shims are cemented in place and the motor mounting bolts checked for tightness.

Now we'll test another hypothetical model of different design. After launching under medium power the model climbs out steeply and then circles smoothly in a climbing left spiral. We increase power and the model almost loops but rolls nicely and then spirals a bit tightly to the left. We can't shim out decalage because the stall recovery is a bit slow already so we add a few degrees down thrust. Now she climbs out at about the right angle but the left spiral seems to tighten a bit towards the end of the motor run. The motor is revved up a bit more and the model moves straight out and up and starts its left spiral climb. But the spiral gets tighter and tighter till the model is screaming around in a vertical left bank. We can't apply left tab because it's flying too straight vertically and would loop. Again we use the combination of thrust and tab. Left thrust is added to start the model into its left climb pattern sooner. Right tab is added because as the model's speed increases, this will prevent it from tightening into the sharp left spiral. A little experimenting with right tab and left thrust and we have the proper left spiral but still too tight a spiral is needed to prevent looping. As we can't shim out decalage, more down thrust is the only solution and finally the model grooves up as it should.

In our third hypothetical model full power performance is perfect but, if the model recovers poorly when the engine stops, it spiral dives badly in the glide to the left opposite the right spiral climb. Under normal recovery everything is all right. Since we cannot depend on a perfect transition from climb to glide everytime, we must correct the dangerous spiral recovery. Slight left thrust and right tab are added and now it recovers from a stall without a bad left spiral dive.

The preceding examples illustrate how side thrust, down thrust, wing wash, decalage, and balance might be used in adjusting. These are, of course, but three examples and do not cover all possible difficulties or solutions. However, the general principles outlined can be intelligently applied to other problems and with patience and practice, adjusting will cease to be a problem.

Radio Control News

(*Continued from page* 23)

affect a 27.255mc receiver when on the ground. However, anything can happen at an altitude of about 50 feet or more. Frank Hoover of CG paid the group a visit and showed up with an .020 powered rudder-only job, using a miniature version of the CG RT-1 receiver. The Los Angeles Dept. of Traffic really goes all out to help the modeler. They won't even deviate from a given transmission schedule without first consulting with coordinator Ken Willard. There is a suspicion, however, that the west coast fliers are picking up 27.255mc skip signals from the mid-west or east. Interesting notes on a contest attended by the Larks in Albuquerque, New Mex. Due to an altitude of 6,000 feet, most ships had a light wing loading. Due to the prevailing sand in that area, flapper type engine control is used instead of the Bramco type control. Howard Bonner had sticking throttle trouble due to the fine sand. Extra large balloon wheels are used, also to overcome the sand situation during

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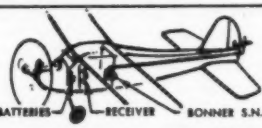
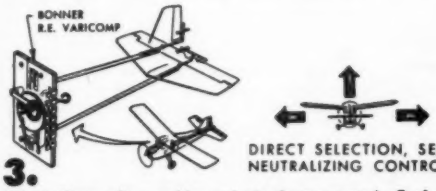
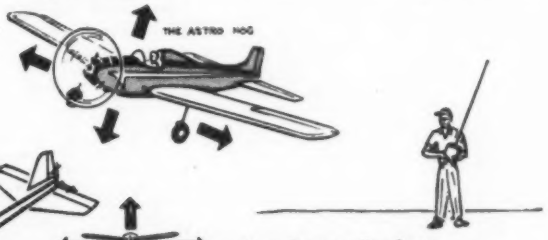


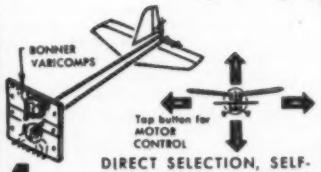
1. RC planes can be flown nicely with a S.N. escapement on rudder. "Hold" signals provide alternate right and left rudder. Bonner S.N. escapements are widely used for quick blip engine control with systems 2, 3, and 4.

2. VariComp on rudder allows direct selection of rudder control and circuits allow addition of more controls when desired.



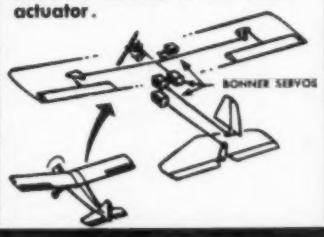
3. R.E. VariComp allows rudder and trip-elevator control off of one escapement. Engine control can be added. R.E. VariComp is also usable in system 4 for "full house controls."





4. Two VariComps with engine control provide a "full house" system.

For Multi-Channel and Proportional Systems, the versatile BONNER SERVO is the ideal actuator.



Use Bonner Products for Power, Versatility & Reliability.

$8.95 VariComp®

$9.75 R.E. VariComp®

$14.95 Servo

$5.95 S.N. Esc.

A complete line of actuators for the most popular types of R/C systems.

BONNER SPECIALTIES . 2900 Tilden Ave. Los Angeles 64, California

takeoffs and landings.

Last minute news from the EBRC group, via the Carrier, mentions that Bob Leininger took first place at a November Precision Contest. Bob flew a lightweight L. W. Champion with CG 5-channel radio and "multi-comps." A "multi-comp" is Bob's version of the Veri-Comp, minus ratchet wheel. It is wired so that one channel operates one position and a second channel operates the other, giving instant response. This also saves about a pound of weight when used instead of servos. It was interesing to note three Champions were flown in the first seven places, plus a Rudderbug, a scale PT-19 and two Smog Chasers. Radio equipment was by Orbit and Babcock with the majority of servos by Bonner. Engines varied from .19's to .35's.

A group of model builders at the International Business Machines Corp., in Poughkeepsie, N.Y. are forming a club. Major interest is radio control. Kelly Day gave a demonstration of his American Scout, featuring any degree of left and right rudder, full- and half-speed ahead, half-speed reverse and stop, all on a single-channel, 27.255mc carrier. Ground control is accomplished from a telephone dial, set at high speed return.

TECHNICAL TOPICS

Fig. 2 shows the landing gear assembly used by Mr. C. G. Morency, 4651 Park Avenue, Montreal, P.Q., Can. A really sturdy gear, he uses it on a giant Live Wire biplane, weighing 17 pounds. Heavy duty 6 in. airwheels are used.

The circuit shown in Fig. 3 is by Henri H. Hoge, 2209 Crest Road, Baltimore, Md., and appeared in the DC/RC Newsletter. It eliminates the relay. It is most suitable to electric servo systems, since it would be impractical to add the circuitry to replace a relay for simple escapement operation. The diodes are 1N34 or 1N69 or equivalent. Batteries A and B are three to six volts and the motor is a Mighty Midget or equivalent. This system was tested as a breadboard model, in conjunction with a multivibrator, ala Walt Good's system. The Mighty Midget motor developed 90% maximum torque. This is not presented as a construction article.

A system used by Mr. R. Greenfield of Birmingham, England, for housing receivers, was shown in the Aero-Modeller. This idea consists of building the receiver into a 35mm film can. A 4- or 5-pin plug may be mounted on the screw lid and the receiver built onto the lid. Simply screw the lid onto the case and you have a fully protected and neat package.

The concept of obtaining simultaneous control on 8-channel reed sets has been put into practice in the past year, using electronic means. However, E. L. Rockwood and the English boys have tried and used this system many, many years ago. Basically, it consists of a motor driven switch, having the required number (channels) of conductor segments. The conductor segment disc must be driven at a fairly low speed, about four to eight revolutions per second. For 8-channel operation the speed would have to be increased to about 24 revs per second, thus giving a ⅛ second delay. The receiver relays must have a time delay circuit on them (usually a 5-10mfd capacitor) to hold them in for the next pulse. This is a simple system which can be attached to the Citizenship 2-channel and the Babcock 3-channel transmitter.

FCC Docket, Number 11997, concerns allocation of frequencies, such as might be used for RC work. It is felt that a maximum of five watts input to the final stage is more than adequate. A set of spot frequencies separated from each other by

THE NEWEST!
TEMPUS FUGIT 8
3 Point Outboard Hydroplane
in STYROWOOD*
for gas or electric motor

*STYROWOOD is an amazing new molded material featuring all the advantages of wood model-making.

Tempus Fugit is Latin for "Time Flies" . . . and this hot speedboat really goes! It's sleek, sturdy and 16 in. big! You build it from a complete kit with STYROWOOD molded hull sections; die-cut plywood parts; colorful decals; full set of plans.
Styrowood is light, strong, fuelproof and can be cut, sanded and painted to hand-made perfection.

$1.95

See it today at leading hobby centers.

Sullivan Products
2300 STRATFORD RD., WILLOW GROVE, PA

★ New RC Items From Ace ★

★STICK-TROL PULSER

Here is the simplest dual proportional rig that can be used with your present receiver and transmitter. Stick control box varies pulse rate and pulse width. It is used with the Mighty Midget motor or with the Robot Junior in the plane to work both the elevator and rudder. As pulse width is varied rudder will move to the degree desired. As pulse rate is varied from 3 to 10 times per second, elevator goes up or down. Pulser is mounted on sub-chassis housed in transmitter cabinet. Uses two 3V4 tubes. Special Allen Bradley 60 degree pots. Motor control may be added. Elevator trim pot included. Developed in the Vestal area. Comes with Sigma 4lF relay, sub-chassis punched, two 3V4 tubes, pre-fabbed stick control box, all required components $19.95
Same as above with Sigma 4F relay $21.95

★TECH TWO TRANSFORMER

When the Tech Two Receiver was introduced in the '57 Air Trails Annual there was quite a great deal of interest for it on 27¼. Ace has had some transformers wound especially for the Tech Two and upon experimentation find that the Tech Two works beautifully on 27¼. Order your transformer now and a free data sheet will be included which shows how to work it on 27¼. All components for a 27¼ version in stock including transformer wound by Jaidinger Manufacturing Company.
Special at $2.50

Ace Radio Control
BOX 301
HIGGINSVILLE, MO.

NEW 1958 CATALOG
WRITE FOR 58-1M
IT'S FREE!

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BOX 1896
MYRTLE BEACH, S.C.

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For that "Finishing Touch"

only $3.95

HOBBY SPRAY GUN

410M PRODUCTS

New and Improved.

Operates from vacuum cleaner.

Give your model that **"finishing touch"!** The Hobby Spray Gun sprays any type of paint, dope, vinyl, lacquer, or water-base paint. Will spray up to 10 sq. ft. with one filling of 48 cc. jar. It is chrome plated for easy cleaning and protection against chemical action. Includes vacuum attachment. May be used with piped or compressed air. No moving parts, always in adjustment, simple to operate. The ideal spray gun for modelers and hobbyists and the do-it-yourself fan . . . paint your model planes, cars, trains, boats, display shelves, etc.—the Hobby Spray Gun gives them that **"finished touch".**

stewart/lundahl co.
7342 Fulton Avenue
North Hollywood, California

two or more megacycles would be ideal. The selectivity of present super-regen receivers is not adequate to give good performance, especially in a narrow band of from 26.96 to 27.255mc. Opening or relaxing restrictions of the 460-470mc band could be of great help. Crystal oscillators might be used in the transmitter. Allocation of frequencies in the 30-100 mc band are advocated. This range would fall in line with present equipment and no operating troubles are anticipated.

What does all of this boil down to as far as the FCC is concerned? The FCC must realize the number of RC users before a decision can be given. In 1955 the Commission granted 5,400 permits for RC use. In 1956 they were being issued at the rate of 700 per month or 8,400 a year. It is believed that 1957 exceeded this figure. It is still very important that each user of 27.255mc and 465mc register with the FCC. Form 505 does not require an examination or code test; merely fill out the form and send it in. It should be the aim of every club in the country to insist that all members and personnel who use these frequencies for planes, boats or cars, have the proper registration. This country is in dire need of engineers and technicians. Radio Control work can contribute in the future. The AMA must have your support if they are to be successful in obtaining new frequencies for your use.

Fig. 4 shows how to make the contacting device on the speed timer (initial installment presented last month). After the gimbal sighting bar has been constructed, the pieces marked A and B are made to print and attached as shown. The purpose of these pieces is to make contact at a predetermined point. The .010 piano wire on piece B should be just long enough to make contact with the 1/16" piano wire on piece A. The large diameter hole in each piece should fit the shaft on the sighting bar. Note the hole in part B should either be larger than the shaft or insulated from the shaft so as to prevent a short between the part A and B. Part B will swivel around the sight-bar shaft and can be locked in place by the thumb screw or wing nut as shown. It is advisable to keep the fit between part B and the shaft as close as possible, still maintaining free turning.

If you desire, the brass parts can be cadmium plated and the .010 and 1/16 wires can be silver plated, however, the silver plating is not needed for good contact resistance. Next month we'll finish the electronic section. It works like this. The contact points are pre-aligned from a sight across the start and finish line. The plane is tracked and the contacts will make at the predetermined setting, hence no need to keep one eye on the plane and the other one on an imaginary line. The electronic "black box" will make contact at the precise time, feed the signal to a thyratron, which in turn will control a solenoid for operating the stop watch. To be more fancy, a regular timing clock can be used in place of a stop watch. The "black box" will operate from an input resistance of up to 500,000 ohms, hence no need to plate the wires or maintain a low contact resistance. Incidentally, the wire on part B should be able to slide past the wire on A. The return trip is tracked in the same way and the difference in the thickness of wire, being relative to both sighting stations, is immaterial. True, the point of contact may be off a slight bit on the return track, but each sighting station will be off the same amount. We hope this system will help ease the problem of timing speed runs. Distance between stations, voltage drop, etc., are all taken care of in the "black box."

NEW ITEMS

The famous 3PN deBolt Multi-Servo is replaced by the new model 3PNX. The 3PNX compound-type servo operates a control, such as rudder, with any single-channel radio. The main difference from the 3pn is that this new model will do the job without a sequence. You can get left or right rudder directly. The 3PNX also can operate a second actuator by means of a built-in auxiliary circuit. The motor has oilite bearings and a turned commutator for more reliable and smoother operation. The gears are of nylon and the brake has a vernier screw adjustment for precise indexing control. This 2-ounce actuator develops over two foot pounds of power, has a battery drain of 300ma from a 3v source, and a response time of .2 seconds to the first control position.

Also from the deBolt Model Engineering Company is their new Custom Live Wire biplane. Four years of development went into this 66" model, which came within ½ point of the first place winner at the '57 Nats. Ground control is said to be equal to the air control, a very unusual feature in itself. Bare weight is four pounds and engine can range from a .25 to a .35. The model is designed for rudder, elevator, engine, aileron, tail-wheel, wheel-brake and wing-flap control. Symmetrical wing sections and a low wing loading make this a maneuverable and easily controlled model.

For the ultimate in control stick switches, the Hetherington Company of Folcroft, Pa. and El Segundo, Calif. has announced their new Type F441 four-way switch. Center position is off and when a cloverleaf gate panel is used, the switch is restricted to one contact at a time, such as left or right or up or down. Without the cloverleaf gate, two controls can be actuated at one time or the switch lever may be moved in an arc to actuate all four contacts in succession. This is so new that no other information or prices was available at the time of writing. Contact your electronic parts distributor.

Gyro Electronics Co., 325 Canal Street, NYC has new items in a switch, a plug, and socket. The switch is a small American made SPST unit which mounts into a ¼" diameter hole. Contacts should handle several amps and the price is but 25 cents. The plug and socket combination is of the 9-pin miniature type and sells for 45 cents for the combination. Should be a good item for those connections encountered in multi-channel work. The plug design is of the header from 9-pin tube bases.

From time to time we present new items which while available, are rather specialized or expensive. These items will become more readily available and be less costly in time, or when they reach the surplus market. The latest items include Philco transistors capable of operating at 1000mc, a sensitive relay by the General Automation Corp., Mountain View, N.J., capable of picking up on 20 microamps at 100 millivolts. These are small transistorized relays with the battery source inside the relay case. New small relays, models SC and SL, are made by Potter-Brumfield. These units fit into crystal-size housings and weigh 5/8 ounces. SL is a latching type and SC is the conventional non-latching type. Sub-miniature indicating lamps and indicating switches, in addition to Teflon feed-through insulators which can be pressed into chassis holes, are other

(*Continued on page* 62)

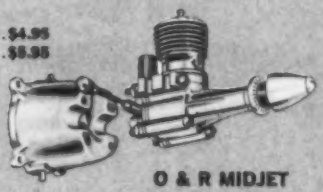
ALL FROM CHEMINOL!

O & R .049 AIRCRAFT ENGINES

Now Available with All-New Automatic Starter!

Most powerful ½A engines ever built.... now available with the revolutionary new O & R Pull-Starter (optional equipment) for split-second, sure-fire starting —automatically! Standard equipment: O & R's famous Focused Jet-Stream Porting for extra pep and power.

O & R MITE—
Short-shaft engine design . $4.95
With Automatic Starter . . . $5.95



O & R MIDJET
Long-shaft model complete with fuel tank $5.95
With Automatic Starter . . . $6.95

O & R MOTORJET RACER

Starts & Launches Automatically!

So easy to handle: a simple pull of the all-new O & R Automatic Starter and the .049 engine is running! New Centrifugal Clutch provides automatic launching—without "throwing" or even pushing. Authentically designed and built, in every detail. Available in Red, Yellow, Blue, and White. Kit includes completely-assembled racer, driver, bridle, swivel post, hook-up wire, wrench, AA fuel and pouring spout, extra KS-5 Glow Plug.

$14.95 complete

O & R .049 MARINER

All Bronze Parts Plated In 24 Carat Gold!

Exclusive Water-Scoop Design and Continuous Water Circulation prevent overheating, even when enclosed. Completely water-jacketed cylinder for coolest performance ever possible! Front open flywheel assures fast, easy starts.

COMPLETE INBOARD INSTALLATION PACKAGE (as shown, unassembled) $12.95

Available Separately:
ENGINE including front open flywheel, integral rear-engine coupling. $7.95

INBOARD INSTALLATION KIT. $5.95

O & R "Kwik-Start" GLOW PLUGS

Impervious to Heat and Fuel!

327.2 continuous hours in laboratory torture tests! Special insulation withstands temperatures at least 3 times higher than any other plug. Platinum-Iridium Filament glows hotter—without burning out! Leak-proof, short-proof, deluxe nickel-plating. World's only complete line; five sizes meet every need. **65¢ each**

O & R FUELS

For Every Model Engine

AA PREMIUM

Most powerful of all ½A engine fuels; ideal for engines in "ultra-small" class. Detergent cleansing action.
Half Pint, 50¢ Pint, 90¢

NO. 2

For A, B and C lapped piston engines delivering consistently high RPMs. Immune to climatic conditions. Detergent cleansing action.
Half Pint, 50¢ Pint, 90¢
Quart $1.75

HELLZ FYRE SPEED FUEL

Most powerful of all fuels ...fastest flame-rate ever developed for model engines! More RPMs for all competition-type glow engines; super-sensitized for free-flight and control-line competition.
Pint, $1.25

O & R ACCESSORIES

A complete line of accessories is available for use with all O & R units described above: Ship Chandler's Kits, Propellers, Flywheels, Couplings, Custom Struts, Battery Cord Sets, Junction Terminal Kits, etc.

See Your Dealer NOW!

CHEMINOL CORPORATION

3340 Emery St.
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ROUNDED-EDGE PLANKING STRIPS

FASTER - NEATER - EASIER

ROUNDED EDGE PLANKING PERMITS EACH PLANK TO FIT FLUSH WITH ADJOINING PLANKS WITHOUT BEVELING!

5/32" x 3/16" x 36" Long

Package of 100

$2.50

Do not taper planks as with square edge planks. Start planking on flattest sides, trim to fit at top and bottom.....

Since 1933—Leader in Creative Model Kits

BERKELEY MODELS INC.

WEST HEMPSTEAD, NEW YORK, U.S.A.

If no local dealer is convenient, mail orders will be filled by Berkeley Model Supplies, Dept MA, West Hempstead, N. Y. Please include 25¢ packing & postage.

items which will be used by the RC builder of the future.

Ace Radio Control now stocks ¼-watt resistors, measuring about 1/16" diameter by 9/32" long, in popular RC values. Also available are battery chargers for 2 to 6v wet cells and a special job by MC for Silvercels. Those wanting to design their own vibrator type power supplies can get transformers and vibrators from Ace, both 2 and 6v types. If you like to assemble receivers but dread drilling the base, Ace has drilled bases for popular receivers for 50 cents. Screened and punched transmitter cases are also available for the Mac II, WAG and Lorenz MOPA units.

Checked the Wavemaster receiver, marketed by Polk's Modelcraft Hobbies, NYC, and find it simple to assemble and adjust. Range is more than adequate for planes or boats. Raytheon 1AG4's appear to give the best performance in the detector stage. Various reports from the field, show that the Aristo wet cells are giving very good service. These are brand new cells which deliver peak current when you need it and come in a variety of sizes. The Aristo multi-meter, accurate to 2%, is another item which is being used to good advantage by RC builders.

For those desiring individual meters, the Milo Trading Corp., 215 Fulton Street, NYC, has miniature DC panel meters, having a 1½" square case front. Available in 0-30v, 0-500v, 0-1ma, 0-100ma and 0-500ma ranges, these meters sell for $3.75.

Texas Instruments, Inc., Dallas, Tex., long famous for a variety of high quality transistors, diodes and other small components for industry and the military, now has made their line available to commercial users. Many RC set manufacturers in this country use this brand of transistor. Following are a few distributors around the country who can supply your needs: Radio Wire and Television, 165-08 Liberty Avenue, Jamaica, N.Y.; Genesee Radio and Parts, 2550 Delaware Ave., Buffalo, N.Y.; Allied Radio Corp., 100 N. Western Ave., Chicago, Ill.; Radio Product Sales, 1501 Hill St., Los Angeles, Calif. and Midland Specialty Co., 1712 Lomas Blvd., Albuquerque, N.M. Many other distributors can be had by writing to TI for their listing.

A last minute item from the Dyna-Vac Company, Box 295, Atlanta, Ga. Multimeter, M70, 60 ranges and an accuracy of 2% on the DC volts scale. Capacitance, inductance, mutual conductance, audio frequencies of from 20 to 20,000 cps, RF volts and many other ranges are featured. Unlike many meters of this type, the M-70 has a sensitivity of 30,000 ohms per volt DC. This $53.84 unit would be an asset to any club or workshop. A smaller 18 range meter with a 6,000 ohms per volt sensitivity is also available. Model SC is $13.53 and will also measure inductance and capacitance. In order to sell these units at their low costs, they are shipped direct from factory to you, with all insurance and postage paid. Dyna-Vac is the sales agency in this country for the Hansen Electric Laboratory and Works Ltd., Tokyo, Japan. Customer pays duty of $8.93 on model M-70 and $3.42 on model SC.

MAN at Work

(*Continued from page* 7)

and package better, preprice their merchandise, and have a better in-stock so that their merchandise could sell better in the mass market, you would see more of the wooden kits in stores and on the shelves of jobbers as well as retailers.

"You state that 50% of jobbers shelves are in plastics," concludes Greenberg, "but, if this is so, it is because plastics move better. Plastics are relatively new, and a large number of the boys building plastics today will be the 'fly-boys' of tomorrow."

• • •

► Can RC modelers co-exist with traffic lights on 27.255? Running through the heart of Nassau County, the Bethpage Turnpike lights now are operating. Officials state candidly that they doubt they can ever come up with a schedule, as did the Los Angeles Traffic Department. Transmission takes place for six-minutes in every 55-minute period. Figure that out on your abacus! They also transmit at 7:30 and 9:30 am, 4 and 7:30 pm. On Sundays, there is no "schedule" whatsoever between 3 pm and midnight. Starting February 1, another operational phase was to be instituted, also without schedule.

If you are smug because you live in Peoria, giva listen. Signals from these systems are being picked up on the opposite coasts.

• • •

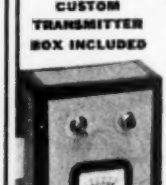
Worried about that nylon prop breaking? Place new prop in water and boil for at least 15 minutes. Add cold water to cool somewhat. As prop cools, align blades by bending as necessary. Do not—repeat do not, immerse in cold water.

Nylon, states Grish Brothers, is an engineering material, not an ordinary plastic. Stresses are set up in molding. These stresses can be relieved by aging or heat treating. Aging takes six weeks to eight months. So boil 'em. While you are at it, put good nylon dye in the water, and have yourself an easter egg. Properly aged and heat treated, a nylon prop is virtually unbreakable—but a small percentage will break due to unknown and unseen effect.

LATEST "CUSTOM MIDGET" RADIO

SIGMA RELAY INCLUDED

CUSTOM TRANSMITTER BOX INCLUDED



ALL THREE $9.98

RECEIVER TUBE "IDLES" WHILE RELAY REMAINS IN UNENERGIZED STATE. (saving tube and battery)

TUBE CURRENT INCREASES and RELAY BECOMES ENERGIZED ONLY WHEN TRANSMITTER IS KEYED

SHOULD RECEIVER or TRANSMITTER FAIL WHILE IN USE MODEL COMES IN RATHER THAN FLYING OUT OF SIGHT (This new type of "Fail Safe" operation fully explained in our instructions)

Fully Re-Designed "CUSTOM RECEIVER" weight under 3 ounces including 10,000 ohm relay (relay included) plus Silver Ceramic Trimmer, midget resistors & condensors, Nylon Coat Coil wire etc. Uses one X F G I Tube which IDLES while relay not energized saving Tubes life, Batteries etc. "CUSTOM TRANSMITTER" 27 M C Exam. Free Band with pre drilled base etc. Transmitter box only 4 ¼" x 5 ¾" (Box Included) may be hand held or placed on Field. Has range of 1 mile or more. Full Drawings and instructions included. "CUSTOM ACTUATOR" of new magnetic principal operates both rudder and elevators or rudder alone off battery supply, no rubber used for Boats, Aircraft, or Cars of small ½ A size up to large 8 ft. models. You do not have to be a Radio Expert to assemble the 3 units, all parts are tagged and marked to correspond to drawings.

"CUSTOM MIDGET" RECEIVER TRANSMITTER and ACTUATOR..... $9.98 ☐

Also Available "STANDARD MIDGET I" Radio kit, this group of 3 units, same design as above, same Relay, Same type Transmitter and Actuator. The difference from above is the Receiver weight which is greater (slightly over 4 ounces) Heavier components used.

"STANDARD MIDGET I" RECEIVER TRANSMITTER and ACTUATOR..... $6.98 ☐

PLANS FOR THE "CUSTOM MIDGET" all three units... 50c ☐

BOOKS
"RADIO CONTROL OF MODEL AIRCRAFT" $2.98 ☐
"RADIO CONTROL OF MODELS"..... 2.50 ☐
"RADIO CONTROL SHIPS, BOATS, AIRCRAFT"..... 3.98 ☐

"SUPPLY SOURCE DIRECTORY" Tells where to obtain Relays, Tubes, Crystals, all types equipment low as 1/20th normal prices. $7.00 MERCHANDISE COUPON FREE with Directory..... price $1.00 ☐
"SPECIAL 10 FOOT TRANSMITTER AERIAL"...$1.00 ☐ SPECIAL 10,000 OHM SIGMA RELAY...$2.98 ☐

X F G I tube...$3.50 ☐	0 to 3 Milliammeter...$3.50 ☐	Soldering Iron.....$2.98 ☐	Black Crackel Finish Transmitter Cases		
3-A-4 tube..... 1.00 ☐	0 to 50 Milliammeter.. 2.75 ☐	Battery Tester, reads 0			
3-A-5 tube..... 1.35 ☐	Both Meters above.... 5.25 ☐	to 2 Volts and 0 to	4" x 5" x 3"....$2.98 ☐		
Keying Switch.. .50 ☐	Peterson 27.255 M C	50 volts..... 2.98 ☐	6" x 5" x 4".... 3.25 ☐		
Micro Switch.... .98 ☐	Z-9 Crystal..... 4.85 ☐	Electric Motor 6 volt	6" x 6" x 6".... 3.50 ☐		
Photo Elec. Cell .98 ☐	Rosin Core Solder,	for Boats 2 to 4 Ft.	10" x 8" x 7".... 3.98 ☐		
Variable Resistor .50 ☐	Kesters 3 ounce box.. .50 ☐	$8.50 value..... 3.88 ☐	Neon Bulbs 15 for 1.00		

25c ☐ NEW and FULLY REVISED Radio catalogue. Shows parts as low as ½ to ¼ the price you normally pay. Also gives more details, more photos etc. of our kits....25c. 25c ☐

MODELLERS—Check off each item you wish to order above. PRINT YOUR NAME AND ADDRESS on a separate sheet of paper with above order. Send REMITTANCE IN FULL.

RADIOMODELS, BOX 36, DEPT. M BALTIMORE 6, MARYLAND

NYLON
Made from DuPont ZYTEL®
. . Crashproof EVEN IN GROUND LOOPS
• 10 TIMES more DURABLE than ordinary propellers!
• More FLEXIBLE than wood
• STRONGER than steel
• Not brittle at sub zero temp.
• Will not soften under summer heat
• Rigid enough, keep shape in all maneuvers
• Fuel Proof • Heat proof up to 320° in constant use.
50¢ EACH
BIRTH OF A NEW ERA FOR THE MODEL FLYING WORLD
Nothing like it EVER! Nylon being a material, not a plastic, is safe at any RPM of today's engines.
Almost unbreakable even in rough use such as ground loops, or hard landings of gearless combat jobs.
Incredible strength. Only twice the weight of wood, yet TWICE the strength of steel!
Tops performance of all others . . . even famous Plasticote Propellers.
Sizes in Tractor type (right hand):
2-blade: 5½-3, 5½-4, 6-3, 6-4 ea. 25¢ 2-blade: 9-6, 9-7, 10-6, 9-4,
3-blade: 5-3, 6-3, 6-4 ea. 50¢ 2-blade: 11-4, 11-6 ea. $1 10-4 ea. 85¢
More sizes soon. Ask for them at your local hobby shop. You'll be more than satisfied with this new high level of durability and performance! COLOR NYLONS! Just dip in any boiling Nylon dye like Rit for beautiful color props. Permanent.
25¢ EACH
Tornado on the GO Fast
85¢ EACH
GRISH Bros.
St. John, Indiana
®Zytel, a registered trademark of E. I. du Pont de Nemours & Co.

Return broken props for replacement. Well, they said it—not us.

• • •

► Who and what is a national Champ? Can you pick a champ at the Nats? From Dick Schwarzchild, Wilkes-Barre, Pa., a resounding nertz. Bob Hemmingway, Audubon Park, took 55 places, 33 of which were firsts of High Point trophies, during 1957. That includes two firsts at the Nats, as well as a 2nd, third, fourth, and fifth. Bob did it the hard way at 17 meets from Florida to Massachusetts. Dick asks, "Why penalize the guy who doesn't have room to fly free flight?"

Under the present system a guy like Hemmingway doesn't stand a chance; his wins are all control line. Even his terrific Nats showing left him out of the running—he could count only three of the five events entered. So why not a national point system based on what a guy does during the year? A guy can get hot at the Nats and walk off with everything in sight—yet be a bust all year long. And a fellow who slumps at the Nats may take 40-50 places in other meets. Which should be National Champion? You've got to prove it week after week, in all kinds of weather, against all kinds of modelers, charges Schwarzchild. Reminds us of the Nats during the late thirties when a well known indoor builder was always the Champ simply because too few outdoor events then existed for anyone to catch up.

• • •

► Speaking of California Models, this little heard-off outfit comes up with some interesting kits that others overlook. Taibi's Spacer was one. Now comes the Quicker, Wilev Wooten's Nats combat winner published in MAN. . . . Hobbies for Everyone is the title of a catalogue issued by Western Model Distributors, of Los Angeles. Looks like the magazine section of the Sunday paper. Pictures galore, color printing, sixteen big pages; nearly a million copies were circulated this fall. . . . Cheminol recently made their 5,000,000 Kwik-Start Glow Plug! Beads, indeed! Some punkins, according to the release. Test plug run for 327.20 hours continuously. Cheminol plugs used in oil tools, too, even guided missiles and rockets. . . . New listing of Air Transportation and Management Courses, first since 1948 by any government agency, available free from Willis Brown, Specialist for Aviation Education, Department of Health, Education, and Welfare, Office of Education. Washington 25, D. C. Many moons ago timed indoor flights with Willis!

• • •

► If you are a subscriber who filled out a survey questionaire, you probably wonder what it was all about. Magazines make surveys to get cannon fodder to fire at advertisers. But this survey was another in a continuing series made on the QT to find out what MAN readers want to see. Results would fill a book. A few tidbits: as always, scale U-control is out in front, in an almost dead heat with ukie stunt. RC is third. Maybe this is telling the opposition the facts of life but for a number of years solid models outrank Nordics, and . . . well, you wouldn't believe it. P.S. You guys own over $3,000,000 worth of engines. And you spend a lot more than that on models each year. As one fellow said, "I spent x-dollars last year on models. Pa says so."

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For "Monoline" or Free-Flight Flying

Length 28" 29¼" Wingspan

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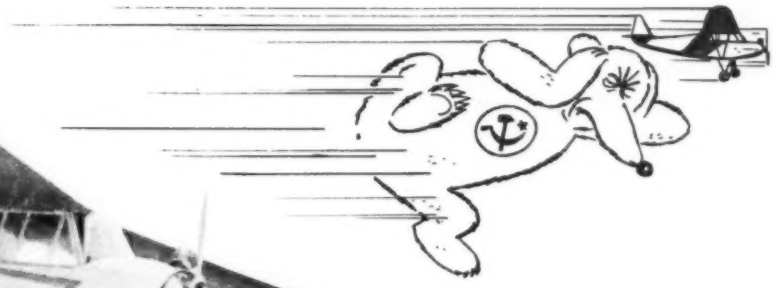
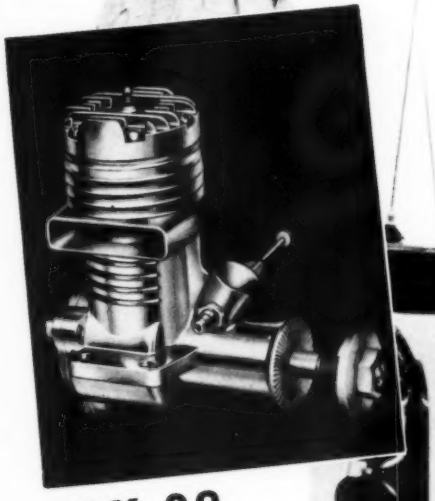


Vernon Kroamer of Sellersville, Pennsylvania with J-3 R/C model which set the World record distance record for Radio-controlled flight. Model had to be flown from pre-arranged take-off spot to pre-arranged landing spot.

Kroamer flew the plane a distance of 4.5 miles to bring the FAI Radio-control distance record to the U. S. Previous record was Russian-held at a distance of 1.49 miles, set in 1956. Time of flight was 14 minutes.

Power was a Fox 29 motor which pulled the 6-pound model along at speeds up to 60 m.p.h.



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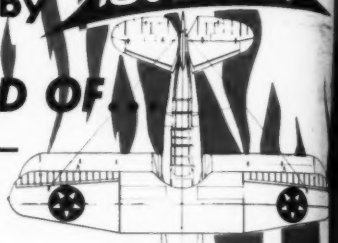

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[illegible]ive of the powerful and dramatic biplane fighter [illegible] of the early 30's, the fabulous SBC-3 "Helldiver" by [illegible] was a carrier based dive bomber, and the forerunner [illegible] the "Helldiver" of World War II. Powered by 750 hp. Pratt & Whitney Twin Wasp, it was one of first of its kind with retractable gear. Carried belly tank, bombs, machine guns.

Unfold the plan and you will crave to build it. Everything is detailed, no chance of error. Formers and ribs fall in place, align themselves. The structure is light, yet very rugged where necessary. The upper wing is wire mounted for greater strength, flexibility. Symmetrical airfoil sections for advanced stunting. Rounded edge planking strips around the fuselage fit neat against the other, no tapering, fitting. Wing ribs are cap-stripped, may be all-sheet covered if you so desire. Servo operation of flaps, hook and motor control.

On the field the "Helldiver" will draw the crowd, for even before it flies it is a thing of beauty. Its detail, its planform, the crackle of power within its cowl speak of the performance to come. Taxi it slowly, gun the engine . . . and the ground falls behind. One instant it is glistening in the sun high overhead, then in a screaming dive toward a tethered balloon — throttle back with full flaps, arresting hook extended for a carrier landing. Install lights and fly by night! Your dealer will be glad to show it to you!

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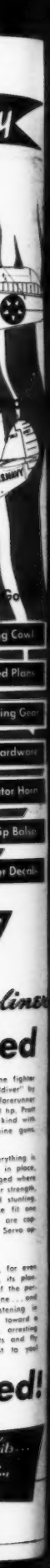
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